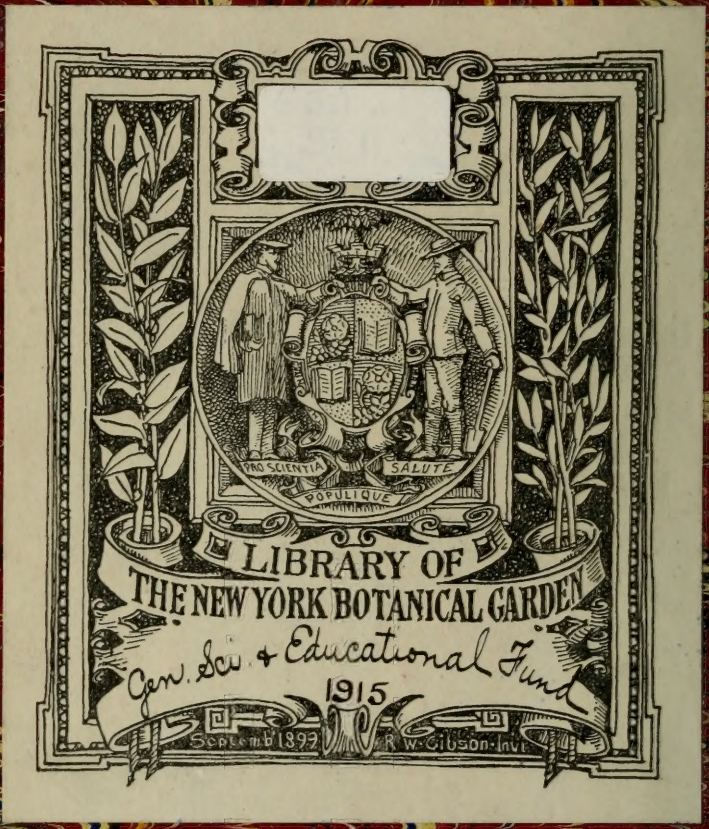
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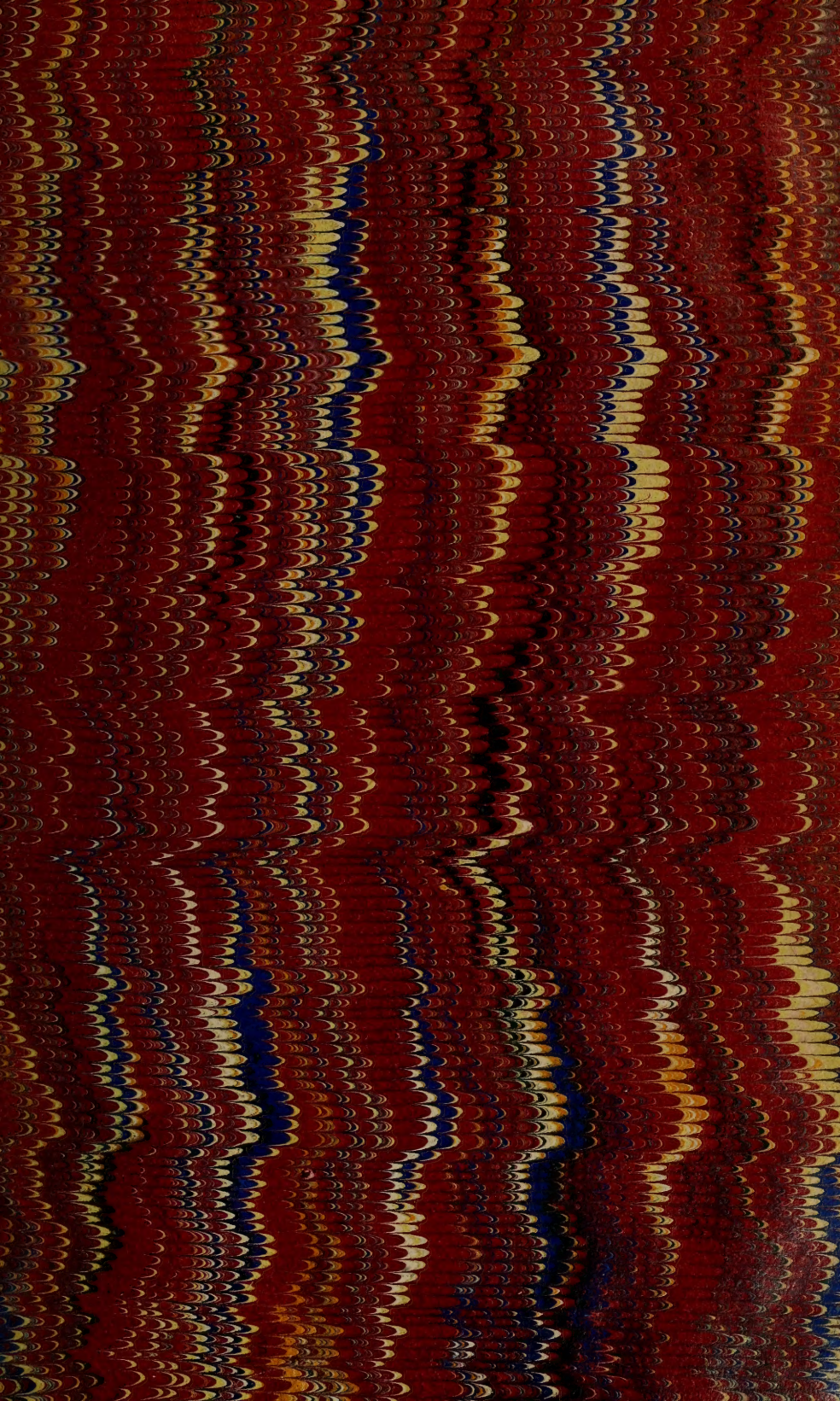

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MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

JANUARY, 1872.

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1872.

MONTHLY REPORT.

DEPARTMENT OF AGRICULTURE,
Statistical Division, January 18, 1872.

SIR: I herewith present for publication the results of a statistical investigation of the rate of yield and home values of the principal products of agriculture, together with articles upon rice production, the progress of the beet-sugar manufacture in the United States, swamp-land reclamation, and the Potomac lands; also data from the divisions of chemistry and entomology, scientific notes, facts from foreign sources, and meteorological records for the month of December.

J. R. DODGE, *Statistician.*

Hon. FRED'K WATTS, *Commissioner.*

YIELD AND PRICES OF FARM CROPS.

The January returns of statistical correspondence give the estimated yield, by counties, of each principal crop, and the actual prices at which an average quality of each product is sold in the home markets. These averages are combined in obtaining the rate of yield and prices (in home markets) of each State. The accompanying tables give these State averages of yield and price, for corn, wheat, rye, oats, barley, buckwheat, potatoes, tobacco, hay, and sorghum molasses.

YIELD OF CORN.—An increase in the amount produced, per acre, is shown in Massachusetts, Rhode Island, Connecticut, New Jersey, Maryland, Virginia, South Carolina, Missouri, Illinois, Minnesota, Iowa, Nebraska, Kansas, and California. The section west of the Mississippi River gives the highest averages, Iowa standing at the head of the list, at 42.5 bushels per acre; Nebraska following, at 41.5; Kansas, 40; Ohio, 38.5; Illinois, 38.3; Missouri, 38; Wisconsin, 37.7; Minnesota, 37.3; New Jersey, 36; Indiana, 35.7; New Hampshire, 35.7; Vermont, 35.6; Pennsylvania, 35.5; Massachusetts, 34.3; New York, 33; Connecticut, 31.4; the remaining States running below 30, down to 10 in South Carolina. The highest yield in the South is 26.7 bushels in Arkansas.

YIELD OF WHEAT.—The yield, per acre, of wheat is reported greater than last year in New Hampshire, in all the Middle States, in Maryland, Mississippi, Missouri, Illinois, Indiana, Ohio, and Kansas. The States reporting yields above 10 bushels per acre are Oregon, 19.2 bushels; Massachusetts, 18.2; New Jersey, 18; California, 17.5 (possibly inaccurate, on account of non-receipt of returns from several wheat-growing counties;) New York, 17.2; Connecticut, 17; Vermont, 16.6; Pennsylvania, 16.2; Kansas, 15.9; New Hampshire, 15.2; Michigan, 14; Ohio, 13.9; Missouri, 13.4; Maine, 13; Illinois, 12.3; Wisconsin, 12.2; In-

diana, 12; Maryland, 12; Delaware, 11.5; Texas, 11.5; Minnesota, 11; Iowa, 10.8; Nebraska, 10.3; West Virginia, 10. The lowest average is 5 bushels in South Carolina, Georgia, and Tennessee.

For averages of these and other crops, reference is made to the tables which follow.

PRICES OF FARM PRODUCTS.

PRICE OF CORN.—A material reduction in the home prices of corn, from the quotations of last year, is reported from all the Northern and Western States. The product of the New England States, while bearing a higher price than that received from other sections, is somewhat depressed in value by the present abundance of western corn. The home markets of Pennsylvania, creating an active local demand, have helped to keep up the local prices. In most of the Southern States, in which less is grown than is required for consumption, rates are fully sustained. In Louisiana there is a great difference between the quotations of the river parishes and those in the interior, where the supply is mainly from the home product. In Texas the severe drought, reducing the estimated yield of 1870 from 26 bushels per acre to 19, has had a large influence in placing the average price at $1 11 instead of $1 06 per bushel. Arkansas has felt the effect of western abundance on the lines of inland navigation and of a fair yield on an enlarged area at home, reducing the average from 80 to 66 cents. Tennessee, more dependent upon home supplies, increases last year's average of 47 cents to 51 cents, while showing a yield reduced from 25.8 to 23 bushels per acre. The yield per acre in West Virginia and Kentucky is less than in 1870, and the reduction in price is from 64 to 63 cents in the former State and from 48 to 47 cents in the latter. In Michigan, with a yield reduced from 37 bushels to 32, the price has advanced from 55 to 59 cents. In all of the remaining Western States the average of reported prices is less than last year, and the yield per acre is greater except in Indiana, where the acreage was increased four per cent., and in Ohio and Wisconsin, in which the difference is very slight. The yield in the latter State, estimated at 38 bushels for the crop of 1870, is placed between 37 and 38 bushels by the assessors' returns of that year. The figures for these States are as follows:

States.	JANUARY, 1872.		JANUARY 1871.	
	Yield.	Price.	Yield.	Price.
	Bushels.	*Cents.*	*Bushels.*	*Cents.*
Ohio	38.5	45	39	48
Indiana	35.7	37	39.5	38
Illinois	32.3	32	35.2	35
Wisconsin	37.7	43	38	52
Minnesota	37.3	44	33	51
Iowa	42.5	23	32	34
Missouri	38	31	31.4	44
Kansas	40	29	28	58
Nebraska	41.5	25	29	36

The lowest rate reached is that of Iowa, dropping from 34 to 23 cents, with a yield of 42.5 instead of 32 bushels per acre; that of Nebraska falls from 36 to 25 cents; and of Kansas from 58 to 29 cents, the estimated yield having advanced from 28 bushels (a very small crop for Kansas) to 40 bushels this year.

The following table gives the estimated home prices of corn in January of each year since 1866:

Average price of corn per bushel on the 1st of January.

States.	1872.	1871.	1870.	1869.	1868.	1867.	1866.
Maine	$0 98	$1 14	$1 27	$1 38	$1 59	$1 35	$1 21
New Hampshire	95	1 09	1 30	1 43	1 56	1 37.5	1 21.5
Vermont	99	1 10	1 40	1 34	1 52	1 41	1 15.25
Massachusetts	98	98	1 32	1 32	1 53	1 34	1 10.5
Rhode Island	99	1 06	1 28	1 65	1 64	1 42	1 22.5
Connecticut	1 07	1 14	1 30	1 35	1 50	1 26	1 22.5
New York	82	87	1 03	1 12	1 32	1 16	95
New Jersey	75	81	95	99	1 23	1 03	85.5
Pennsylvania	75	75	92	1 00	1 17	91	80
Delaware	60	65	.....	85	1 02	87	75
Maryland	64	71	73	87	1 09	93	76.10
Virginia	67	65	91	76	85	73	.....
North Carolina	71	78	1 00	78	1 04	1 12	.....
South Carolina	92	1 06	1 40	1 00	1 15	1 58	.....
Georgia	93	90	1 21	91	96	1 52	.....
Florida	1 09	1 35	1 45	1 41	1 38	1 50	.....
Alabama	92	93	1 14	86	79	1 51	.....
Mississippi	98	98	1 12	74	1 09	1 57	.....
Louisiana	1 12	1 10	1 09	75	1 10	1 23	.....
Texas	1 11	1 06	73	62	75	94	.....
Arkansas	66	80	92	63	77	1 14	.....
Tennessee	51	47	77	49	55	77	.....
West Virginia	63	64	79	75	89	64	53.66
Kentucky	47	48	66	47	65	49	43.33
Missouri	31	44	60	57	66	58	52
Illinois	32	35	57	43	68	43	29.25
Indiana	37	38	70	52	65	44	38.70
Ohio	45	48	72	60	82	54	44.42
Michigan	59	55	74	76	96	82	60.11
Wisconsin	43	52	65	58	86	82	46
Minnesota	44	51	63	64	1 07	1 11	51.5
Iowa	23	34	50	37	55	44	30
Kansas	29	58	44	99	55	63	53
Nebraska	25	36	37	69	74	68	59
California	1 16	1 20	90	.....	.....	.....	.....
Oregon	.....	1 00	.....	.....	.....	.....	.....

This table shows that corn was highest in price in 1868, the rate receding in 1869, and again advancing in January, 1870, as a result of the small crop of 1869. The occurrence of two large crops in succession, in 1870 and 1871, has had an important influence in depressing the value of this production to a lower point than has been reached since the war.

In these tables, so full of local variation and fluctuation, are seen the results of meager crops, of the greater prominence of other products, of demand springing from the employment of labor in other industries on the one hand; and on the other the effect of abundance and a large ratio of corn acreage to the cultivated area. An examination of the record, by counties, would show the influence of isolation from railways and river navigation, and of other local circumstances.

PRICE OF WHEAT.—An advance in the averages of county prices of wheat, since January of last year, is made in every State. The crop was an average one, but not so large as that of last year, while the export demand to supply the large deficiency in Great Britain, and that portion of the large deficit in France which shall not be provided for by the substitution of coarser grains and other products, has been unusually pressing. The increase in value in the principal wheat-producing States is as follows:

States.	January, 1872.	January, 1871.	States.	January, 1872.	January, 1871.
Ohio	1.26	1.09	Wisconsin	1.11	.90
Indiana	1.26	1.00	Minnesota	1.00	.83
Michigan	1.32	1.08	Iowa	.96	.78
Illinois	1.18	.94	Missouri	1.16	.91

The prices of past years, as reported by county correspondents, the State averages of which are recorded in the following table, do not show fluctuations and variations so striking as those which appear in the table for corn, but afford a sufficiently vivid illustration of the effect of the rate of yield, distance from market, the relation of home supply to local demand, and other local causes of fluctuations. Prices were highest in 1867, and the lowest in January, 1870, after the great crop of 1869; higher again in January, 1871, and now advanced still further. In Minnesota, Iowa, and Nebraska, the averages are higher than in January, 1869, but in other wheat-growing sections they do not equal the rates recorded at that date.

Average price of wheat per bushel on January 1.

	1872.	1871.	1870.	1869.	1868.	1867.	1866.
Maine	$1 80	$1 78	$1 83	$2 40	$2 79	$2 86	$2 21
New Hampshire	1 72	1 59	1 85	2 42	2 89	2 58	2 60
Vermont	1 64	1 63	1 57	2 26	2 76	2 67	2 18
Massachusetts	1 76	1 75	1 75	2 40	2 81	2 78	2 21
Rhode Island						2 80	
Connecticut	1 55	1 52	1 40	2 00	2 63	2 83	2 37
New York	1 51	1 41	1 37	2 08	2 64	2 67	2 08
New Jersey	1 54	1 43	1 34	2 11	2 58	2 93	2 32
Pennsylvania	1 45	1 27	1 28	1 98	2 43	2 67	2 05
Delaware	1 52	1 25		1 90	2 38	3 00	2 00
Maryland	1 52	1 28	1 30	2 09	2 43	2 94	2 06
Virginia	1 39	1 24	1 21	1 90	2 12	2 85	
North Carolina	1 42	1 21	1 53	2 00	2 11	2 72	
South Carolina	2 03	1 89	2 09	2 25	2 38	3 19	
Georgia	1 66	1 47	1 65	2 20	2 35	2 72	
Florida				2 75			
Alabama	1 56	1 28	1 62	1 98	2 05	2 34	
Mississippi	1 59	1 52	1 75	2 19	2 40	2 53	
Louisiana			1 25		2 50	2 50	
Texas	1 97	1 73	1 70	2 25	1 89	1 45	
Arkansas	1 55	1 30	1 51	2 00	2 01	2 06	
Tennessee	1 28	97	1 15	1 88	2 11	2 21	
West Virginia	1 31	1 22	1 26	1 88	2 30	2 67	1 89
Kentucky	1 29	1 00	1 10	1 86	2 17	2 30	1 70
Missouri	1 16	91	80	1 49	2 00	2 01	1 62
Illinois	1 18	94	76	1 20	1 97	1 93	1 69
Indiana	1 26	1 00	93	1 50	2 21	2 41	1 35
Ohio	1 26	1 09	1 03	1 65	2 36	2 52	1 59
Michigan	1 32	1 08	97	1 64	2 34	2 55	1 65
Wisconsin	1 11	90	68	1 00	1 77	1 67	1 09
Minnesota	1 00	83	59	83	1 48	1 36	80
Iowa	96	78	52	95	1 43	1 42	1 00
Kansas	1 13	86	79	1 35	1 84	1 91	1 77
Nebraska	90	64	51	96	1 32	1 23	1 49
California	1 41	1 10	93				
Oregon		95					

PRICE OF HAY.—The short crop of 1871 has made prices higher than for several years. The advance is greatest in the Eastern and Middle States, in Texas and in California. The States showing a decline are Delaware, Georgia, Alabama, Louisiana, Missouri, Illinois, Minnesota, Iowa, Nebraska, and Kansas. The highest average reported is that of New Jersey, $26 70 per ton; the lowest, that of Nebraska, $4 76. The average for the Southern States exceeds $21—a region where hay of suitable grasses can be cheaply grown, though there is a prevalent contrary opinion elsewhere which may even be shared by southern agriculturists. The average for the Middle States, with their millions of city population, is but little larger. The following is a statement of the average prices of hay in the several States for seven years past:

Average price of hay per ton, January 1.

States.	1872.	1871.	1870.	1869.	1868.	1867.	1866.
Maine	$26 00	$19 69	$15 25	$12 00	$14 62	$19 28	$11 81
New Hampshire	23 00	19 85	15 00	13 50	15 00	17 88	14 70
Vermont	17 50	14 50	13 00	14 50	15 36	15 61	11 50
Massachusetts	29 60	26 14	24 42	18 37	22 12	22 39	21 00
Rhode Island	33 33	24 00	21 75	20 00	26 62	31 66	22 50
Connecticut	31 20	25 60	18 00	17 25	21 60	25 60	23 50
New York	19 42	17 21	12 66	15 00	17 47	16 18	12 33
New Jersey	26 70	19 44	20 20	19 00	22 13	25 00	13 89
Pennsylvania	20 76	13 05	14 85	16 00	14 83	16 14	11 23
Delaware	17 50	20 00	.....	20 00	17 66	17 50	17 00
Maryland	25 71	16 33	17 95	16 77	17 54	20 27	16 43½
Virginia	17 82	14 72	15 41	13 00	12 48	14 28	.....
North Carolina	12 30	11 47	12 11	15 00	12 06	13 00	.....
South Carolina	21 60	21 66	23 33	17 00	19 50	22 00	.....
Georgia	23 06	23 33	21 45	21 90	21 58	23 62	.....
Florida	.....	.....	.....	.....	.....	20 62	.....
Alabama	19 50	20 00	26 25	19 28	20 00	18 63	.....
Mississippi	21 66	21 25	19 33	17 00	16 43	27 50	.....
Louisiana	25 00	28 50	.....	10 00	19 75	30 00	.....
Texas	24 33	15 36	14 18	10 00	16 60	13 60	.....
Arkansas	20 87	15 00	12 60	16 00	20 75	26 43	.....
Tennessee	16 58	16 64	20 34	15 50	18 95	18 63	.....
West Virginia	14 58	10 00	11 17	15 00	11 44	12 22	8 00
Kentucky	14 27	13 25	14 66	13 25	14 80	12 80	12 10
Missouri	10 66	12 82	11 17	11 00	11 11	9 91	12 33
Illinois	10 05	10 74	9 87	10 00	9 73	9 27	9 30
Indiana	12 78	11 46	10 52	11 09	11 63	9 44	9 40
Ohio	11 91	11 02	10 90	13 80	12 32	11 00	8 00
Michigan	17 33	11 17	12 80	15 00	16 14	13 75	12 16⅔
Wisconsin	10 63	10 43	10 50	11 00	11 11	12 25	10 14
Minnesota	6 27	6 77	8 60	7 00	7 28	7 00	8 59
Iowa	6 09	7 70	7 70	6 50	5 77	6 20	7 35½
Kansas	4 91	7 18	5 55	8 16	5 08	7 18	8 00
Nebraska	4 76	5 60	5 03	5 40	5 54	6 43	5 64
California	21 85	16 70	12 70	.....	.....	.....	.....
Oregon	.....	12 05	.....	.....	.....	.....	.....
Colorado	.....	.....	.....	.....	.....	19 00	.....
Utah	.....	.....	.....	.....	.....	17 50	.....

Table showing the average yield per acre and price of the principal crops of the United States for 1871, and the area and condition of winter grain.

States.	CORN.		WHEAT.		RYE.		OATS.		BARLEY.		BUCKWHEAT.		POTATOES, (Solanum tuberosum.)	
	Average *yield* per acre in 1871, stated in bushels.	Average *price* per bushel January 1, 1872.	Average *yield* per acre in 1871, stated in bushels.	Average *price* per bushel January 1, 1872.	Average *yield* per acre in 1871, stated in bushels.	Average *price* per bushel January 1, 1872.	Average *yield* per acre in 1871, stated in bushels.	Average *price* per bushel January 1, 1872.	Average *yield* per acre in 1871, stated in bushels.	Average *price* per bushel January 1, 1872.	Average *yield* per acre in 1871, stated in bushels.	Average *price* per bushel January 1, 1872.	Average *yield* per acre in 1871, stated in bushels.	Average *price* per bushel January 1, 1872.
Maine	27.2	$0 98	13	$1 80	17.2	$1 19	25	$0 66	21.5	$0 87	21	$0 91	142	$0 46
New Hampshire	35.7	95	15.2	1 72	18.5	1 13	37	63	29.4	98	18.7	71	140	49
Vermont	35.6	99	16.6	1 62	16	1 11	35.5	53	22.8	1 22	21	70	160	37
Massachusetts	34.3	98	18.2	1 68	18	1 12	31.4	70	24.2	1 07	15	1 07	126	68
Rhode Island	27.3	99	.....	.....	19.6	1 05	33.3	60	23	1 00	.....	.....	90	73
Connecticut	31.4	1 07	17	1 55	14.2	1 17	31.6	65	.....	.....	24	1 00	106	68
New York	33	82	17.2	1 51	16.6	88	39.1	51	25.9	78	24.1	78	107	48
New Jersey	36	75	18	1 54	15	94	33.3	52	.....	.....	16	92	96	66
Pennsylvania	35.5	77	16.2	1 45	14.6	86	31	49	18.6	90	21.1	93	112	55
Delaware	22	60	11.5	1 52	5	75	20	41	.....	.....	12.5	77	120	50
Maryland	23.6	64	12	1 52	11.5	85	17.7	48	.....	.....	14.2	97	71	71
Virginia	22.6	67	8	1 39	13.6	71	16.4	49	.....	.....	14.4	82	71	71
North Carolina	14	71	6	1 42	6.6	86	10.6	63	.....	.....	11.6	61	105	71
South Carolina	10	92	5	2 03	7.1	1 55	8.9	87	.....	.....	.....	.....	95	1 38
Georgia	10.3	93	5	1 66	7.3	1 56	10.7	80	14.6	1 77	.....	.....	96	1 42
Florida	10.7	1 09	.....	.....	11.5	1 50	13	1 01	.....	.....	.....	.....	73	1 93
Alabama	14.5	92	6.3	1 56	9.2	1 80	13.4	87	.....	.....	.....	.....	85	1 06
Mississippi	14	98	10	1 59	9.2	1 70	13.8	96	.....	.....	.....	.....	88	1 35
Louisiana	14.4	1 12	.....	.....	.....	.....	20	1 12	.....	.....	.....	.....	60	1 37
Texas	19	1 11	11.5	1 97	12.1	1 65	25.1	1 04	.....	.....	.....	.....	105	1 85
Arkansas	26.7	66	8.4	1 55	12	1 75	25	73	.....	.....	.....	.....	82	1 11
Tennessee	23	51	5	1 28	8.4	92	15.2	46	17.8	72	8.2	90	80	68
West Virginia	27.6	63	10	1 31	13	87	25.1	44	11	70	14.1	92	73	66
Kentucky	27.3	47	6.1	1 29	9.4	81	24.3	41	22	84	25	1 25	69	78
Missouri	38	31	13.4	1 16	17.1	59	28.3	30	27.5	62	22.1	71	78	64
Illinois	38.3	32	12.3	1 18	17.8	56	33.1	28	25.5	52	14.1	74	61	85
Indiana	35.7	37	12	1 26	13.9	72	28.8	33	27.4	72	13.5	75	64	82
Ohio	38.5	45	13.9	1 26	14.5	77	34.7	35	26.1	74	14.5	96	96	63
Michigan	32.4	59	14	1 32	14.4	76	34.2	41	23.2	93	15	79	68	83
Wisconsin	37.7	43	12.2	1 11	16.1	60	38.6	35	29.9	56	18.3	62	105	55
Minnesota	37.3	44	11	1 00	16.8	63	33.8	34	25.4	46	20.7	84	123	39
Iowa	42.5	23	10.8	96	19.9	51	41.1	21	29.6	46	26.7	72	131	33
Kansas	40	29	15.9	1 13	19	67	31.8	30	21.8	70	15.2	93	97	69
Nebraska	41.5	25	10.3	90	18	55	31.8	25	29.6	46	16	94	124	32
California	38	1 16	17.5	1 41	27	1 40	40	70	28.4	1 08	26	1 30	152	91
Oregon	26.6	1 00	19.2	1 04	25	.95	29.7	77	29	84	20	1 40	76	1 03

Table showing the average yield per acre and price of the principal crops, &c.—Continued.

States.	POTATOES, (Batatus edulis, sweet.)		LEAF-TOBACCO.		HAY.		SORGHUM MOLASSES.		WINTER-WHEAT.		WINTER-RYE.		WINTER-BARLEY.	
	Average *yield* per acre in 1871, stated in bushels.	Average *price* per bushel January 1, 1872.	Average *yield* per acre in 1871, stated in *pounds*.	Average *price* per pound January 1, 1872.	Average *yield* per acre in 1871, stated in *tons*.	Average *price* per ton January 1, 1872.	Average *yield* per acre in 1871, stated in *gallons*.	Average *price* per gallon January 1, 1872.	Average amt sown compared with 1870.	Condition of the crop compared with an average.	Average amt sown compared with 1870.	Condition of the crop compared with an average.	Average amt sown compared with 1870.	Condition of the crop compared with an average.
Maine					.46	$26 00			125		95	97		
New Hampshire					.97	23 00			98	100	98	98		
Vermont					1.02	17 50								
Massachusetts			1,450	$0 20.5	.96	29 60			55	150	80	94	106	
Rhode Island					.91	33 33					100	100		
Connecticut			1,700	27.6	1.11	31 20					100	100		
New York			657	12.6	1.22	19 42			98	94	99	98	91	93
New Jersey	75	$0 90			1.30	26 70			100	97	98	100		
Pennsylvania	100	88	1,200	15.2	.93	20 76	92	$0 60	101	92	101	95	92	110
Delaware	112	87			1.25	17 50	60	50	100	90	100	100		
Maryland	112	94	650	8.2	1.00	25 71	100	62	101	95	96	98		97
Virginia	92	80	708	10.8	1.21	17 82	85	62	94	102	93	90		
North Carolina	101	62	599	10.3	1.13	12 30	73	52	100	95	101	98	103	96
South Carolina	79	71			.60	21 60	59	56	95	100	98	100		
Georgia	99	62	350	21.4	1.50	23 06	92	56	101	95	100	97	110	102
Florida	127	70					150	45			100	103		
Alabama	103	67			1.33	19 50	76	62	115	103	100	112		
Mississippi	85	73			1.45	21 66	73	76	91	91	100	96		
Louisiana	108	82			1.50	25 00								
Texas	118	91	600	24	1.07	24 33	72	83	115	107	105	112		
Arkansas	120	93	833	14.5	1.67	20 87	133	57	101	87	89	94		
Tennessee	100	77	741	11	1.48	16 58	81	58	96	99	97	99	107	104
West Virginia	91	1 27	605	14.4	.97	14 58	71	67	97	97	93	97	111	95
Kentucky	78	1 06	721	7.7	1.20	14 27	81	56	88	101	90	97	103	92
Missouri	95	1 02	822	8.3	1.55	10 66	98	51	97	80	95	90	91	92
Illinois	80	1 22	731	6.6	1.31	10 05	96	58	101	89	89	89	100	85
Indiana	90	1 25	702	8.5	1.19	12 78	82	54	97	84	95	88	100	91
Ohio	135	1 30	828	9.1	1.22	11 91	101	59	93	82	94	85	85	86
Michigan					1.12	17 33	70	81	92	78	93	85	101	90
Wisconsin			1,200	11	1.45	10 63	60	55	107	93	99	99	103	100
Minnesota					1.55	6 27	73	71	102	99	105	70		
Iowa	110	91			1.64	6 09	121	57	120	98	88	91		
Kansas	128	1 15			1.90	4 91	110	58	105	80	97	92	100	103
Nebraska	100	2 12			1.80	4 76	105	61	134	113	115	116		
California		1 10			1.29	21 85			132	100			115	100
Oregon					1.62	19 40			117	98				

CONDITION OF WINTER WHEAT.

The following extracts of notes from regular correspondents will give some indication of the condition of winter wheat:

VERMONT.—*Grand Isle:* Wheat is not raised here to any extent; apt to winter-kill.

NEW YORK.—*Genesee:* Was sown in good season, but owing to dry weather the growth is small. *Otsego:* Is not in a satisfactory condition; the autumn was dry and the growth slow and feeble. *Putnam:* The prospects are better than for three years past. *Steuben:* Looks unfavorable.

NEW JERSEY.—*Burlington:* Shows less top than usual.

PENNSYLVANIA.—*Bradford:* Has had a very unfavorable autumn, and the growth is very poor. *Chester:* Winter unfavorable, and the prospects poor. *Clearfield:* Looking well. *Clinton:* Looks bad; small when winter set in and without snow to protect it. *Franklin:* In some parts of the county injured by "the fly." *Greene:* Not looking well, though yet uninjured materially by the winter. *Indiana:* Is not in a favorable condition, and a short crop is feared. *Lancaster:* In appearance, poor; the winter has been very severe. *Luzerne:* Has had favorable weather so far. *Lycoming:* Looks badly; no snow to protect it from the intensely cold weather. *Tioga:* Failed to come up in some instances; weather dry bitterly cold. *Westmoreland:* Has but little snow to protect it from the cold.

MARYLAND.—*Baltimore:* Is short, but seems in good condition. *Cecil:* Was sown early; in some fields it is injured by "the fly." *Washington:* Does not promise well; the fields look bare.

VIRGINIA.—*Campbell:* Is looking extremely well at the present time. *Chesterfield:* Looks well; the acreage considerably increased. *Culpeper:* Looking better than at this time last year; that sown by the drill invariably looks the best. *Cumberland:* Unpromising, owing to the severe weather in December. *Fluvanna:* So far looks well; the growth is promising. *King and Queen:* Is suffering from the unfavorable weather. *King George:* Looks well, has suffered but little from extremely cold weather. *Mecklenburg:* Made a fair growth, with a fine stand before the cold weather set in. *Orange:* Came up well and promised a better harvest than usual; the acreage is somewhat decreased. *Prince George:* Less acreage than last year, owing to the rainy season. *Pulaski:* Is promising; the freezing weather does not seem to have damaged it. *Rappahannock:* Owing to the drought, the acreage is less than heretofore. *Rockbridge:* Has been injured by the weather. *Spottsylvania:* Looks very promising; a larger acreage has been sown. *Surry:* Is small; it seems to have suffered from cold; there is an increase in the acreage, but put in without fertilizers. *Washington:* Looking badly; owing to the drouth the acreage sown was lessened. *Wythe:* Was sown in less quantity, owing to the dry weather.

NORTH CAROLINA.—*Beaufort:* Not a great amount cultivated, and badly injured. *Craven:* But little sown in this county. *Gaston:* Sown in excess of last year and looks well. *Hertford:* Much below an average quantity sown and it looks unpromising. *New Hanover:* Is sown in such small quantities as hardly deserving of notice. *Northampton:* Sown in smaller quantities than usual. *Rockingham:* Looking well so far. *Stanley:* Looks well, the stand being much better than was feared. *Warren:* Very unfavorable weather.

SOUTH CAROLINA.—*Anderson:* Looks well. *Greenville:* Is in fine condition, having been covered twice by snow. *Richland:* Is seldom cultivated except in small lots for home use. *York:* Has been retarded in its growth by the cold weather.

GEORGIA.—*Cobb:* The Tappahannock wheat, sent by the Department of Agriculture, is beginning to show its superiority over other kinds sown as winter-wheat; the crop heretofore has been a failure. *Douglas:* An increased acreage sown last autumn but the severe weather has prevented it from coming up to any extent. *Richmond:* Looks very well, though little was sown this season. *Worth:* The rust has spoiled this crop so that farmers are beginning to despair, merely planting a little for home use.

ALABAMA.—*Colbert:* Is small though promising; more than usual care was taken in preparing the ground, and the crop may be above the average. *Greene:* An increasing interest in this crop is manifested.

MISSISSIPPI.—*Lee:* Destroyed by the wet weather.

TEXAS.—*Gillespie:* Sown early, is in very good condition; that late-sown needs rain. *Kaufman:* Looks well; that received from the Department of Agriculture looks very well. *Kendall:* Planted late in October, looks remarkably well. *Lampasas:* Looking finely, an increase of acreage over last year. *Medina:* Had a fine stand, until the extremely cold weather of December, which seems to have injured it. *Red River:* But little sown and that looks unpromising on account of the freezing weather.

ARKANSAS.—*Columbia:* Less sown than usual. *Washington:* Is reduced in acreage owing to bad weather in the autumn and scarcity of good seed.

TENNESSEE.—*Coffee:* Less has been sown than for many years past. *Dyer:* Is slow in its growth; the land was well prepared and the stand good. *Fentress:* More sown than usual; the dry weather has been injurious. *Giles:* Looks remarkably well. *Hancock:* Very unpromising. *Henry:* None raised in this county. *Knox:* Looks well; does not seem injured by the extremely cold weather. *Monroe:* Promises well, though most of it was planted too late. *Rhea:* Very promising; the seed sent by the Department of Agriculture grows and looks well. *Roane:* Is looking fine and healthy. *Smith:* Has been put in much better than heretofore, though the acreage is ½ less than usual. *Wayne:* Is looking well. *Wilson:* Is promising; so far it is uninjured by the freezing cold; more than usual care was taken in preparing the ground.

WEST VIRGINIA.—*Berkeley:* Looks well. *Brooke:* More sown than usual, but owing to its being carelessly done the condition is barely an average. *Monongalia:* Did not get a good start, but looks tolerably fair. *Tyler:* Condition generally favorable.

KENTUCKY—*Boyle:* Has an increase of acreage. *Grant:* Dry and freezing weather renders the propects poor. *Hardin:* Looking unusually well. *Lincoln:* Was looking well till the late cold snap, which has injured its appearance somewhat, but it is not frozen out. *McCracken:* Looks well, notwithstanding the dry autumn. *Mercer:* Prospects fair. *Warren:* Presents a fine appearance, though only half as much as usual has been sown owing to repeated failures and the difficulty of procuring good seed.

MISSOURI.—*Atchison:* Looks well at this time. *Callaway:* Badly winter-killed. *Cape Girardeau:* Makes but little show yet; very late in planting. *Carroll:* Owing to the dry weather it was late in planting, and now looks unfavorable. *Cedar:* Hard winter on this crop. *Clay:* Has very favorable weather. *De Kalb:* Looks very badly. *Jasper:* Prospects poor; that which was sown broadcast looks as if nearly killed. *Jefferson:* Is looking well. *Livingston:* Bare ground and hard freezing are injuring this crop very much. *Macon:* Is in very poor condition, and the area sown ½ less than last year. *Maries:* Prospects bad. *Mercer:* Has favorable weather; ground covered with snow since December 15, 1871. *Moniteau:* Looks very promising. *Oregon:* Looks bad; the weather very cold and hard upon the crop. *St. Louis:* The condition of the crop is below the average. *Vernon:* Badly frozen out; only attached to the earth by the tap-root.

ILLINOIS.—*Alexander:* Has failed to come up in many places; late planting and intense cold has been the cause; what is visible looks small and weak. *Brown:* Prospects very gloomy. *Cass:* Looks very poor, owing to the hard weather. *Champaign:* Owing to the dry and cold weather looks very unpromising. *Fayette:* Seems fair, though the winter has been severe; the acreage is larger than usual. *Greene:* Is injured by the weather. *Hancock:* Is not doing well; no snow to protect it. *Macoupin:* Has suffered from the cold weather; little snow to protect it; the top appears to be killed more than usual. *Marion:* Has been injured by the dry and cold weather. *Monroe:* Looks bad; sown late on account of drouth, though wheat sown earlier looks well. *Pike:* Looks well, but only one-fourth as much sown as usual, the autumn was so very dry. *Williamson:* Is not very promising; late plowing, continued dry and extremely cold weather have damaged the crop.

INDIANA.—*Brown:* Has not frozen out much. *Crawford:* Not winter-killed yet, and prospect is moderately good. *Dubois:* Was generally sown late on account of drought, and does not look well. *Grant:* Prospects poor. *Hamilton:* Is very short on account of drought. *Johnson:* The prospects are sad indeed. *Kosciusko:* Has been injured by the cold, dry and windy weather. *Lagrange:* Is only partially up; the weather has been very unfavorable. *Ohio:* Prospects are poor, but with little growth to stand the cold. *Owen:* Not a field in the county at all promising. *Parke:* Is in the worst condition known for at least 20 years. *Posey:* The dry, cold weather is hard on this crop. *Putnam:* Is very promising, being protected by snow during the intense cold of December. *Ripley:* Has suffered badly from the dry and cold weather. *Warren:* Prospects are unfavorable; too much dry weather.

OHIO.—*Adams:* Looking rather delicate; the growth is small. *Auglaize:* The dry autumn reduced the prospects of the crop below the average. *Carroll:* Makes a very poor show on the ground—scarcely visible; the weather has been and is unfavorable. *Coshocton:* The appearance is above the average. *Crawford:* Looking badly. *Lorain:* Looks poor, owing to the drought. *Mahoning:* Prospects good, considering the hard winter. *Morrow:* Sown early looks well; the late sown is indifferent. *Union:* Makes a poor show; dry weather and the fly have damaged it. *Vinton:* The area sown is small, owing to the drought, and the prospects are poor. *Washington:* Sown early looks well; sown late is not half up. *Wood:* Did not come up well, and looks badly.

MICHIGAN.—*Montcalm:* Never looked more unpromising than it does at this time. *Ottawa:* So far this crop has had favorable weather. *Sanilac:* The dry weather and continued cold render the prospects poor. *Shiawassee:* Looks bad. *Tuscola:* Is in very poor condition; but little top and not prepared to stand the present weather. *Wayne:* The drought prevented much of the wheat from germinating, and the intensely cold weather has been hard on that which came up.

WISCONSIN.—*Calumet:* Looking very poor. *Columbia:* The area of this crop is in

excess of any year during the past twenty years, and was in good condition when the snow fell, which now covers it to the depth of 12 inches. *Outagamie:* Looks bad; very late in being sown.

MINNESOTA.—*Sherburne*: Long-continued drought nearly ruined the crop. *Winona:* Dry weather was hard on wheat and it looks thin.

IOWA.—*Henry:* Not looking well, owing to the dry weather. *Jefferson:* An increased acreage to meet the anticipated loss from the chinch-bug. *Lee:* Has suffered considerably, there being no snow to protect it from the cold. *Marion:* Made but small growth on account of the extremely dry weather. *Polk:* Has so far wintered well.

KANSAS.—*Atchison:* Continued drouth prevented as much being sown as usual. *Bourbon:* Put in late on account of drought, and the weather is still unfavorable. *Clay:* Partially winter-killed, caused by severe weather and late sowing. *Coffey:* Very unpromising; late sowing and hard weather. *Cowley:* Looking badly, owing to the winter setting in early. *Franklin:* Less put in than usual, owing to dry weather, low price of grain, and a desire on the part of some farmers to increase the acreage of blue grass and timothy. *Johnson:* Not much sown on account of drought. *Labette:* Sown late on account of drought, then hurriedly put in, and since then, (November 18,) the weather has been severe, and the prospects are gloomy. *Lyon:* The drought lessened the acreage, and its continuance, with the intensely cold weather, prevented the crop from making much of a growth. *Marion:* The bad weather makes the crop look worse than usual. *Marshall:* Fears are entertained that the cold has killed the crop. *Miami:* Was late in being sown, and the prospects are bad. *Morris:* but little sown on account of drought. *Nemaha:* The autumn being dry, more than usual was sown, and though the growth is not large, it looks well. *Neosho:* Does not look very encouraging for a good crop. *Osage:* Is in bad condition. *Republic:* A large increase of acreage sown. *Riley:* Sown late and suffered from the freezing weather. *Shawnee:* Dry weather made it late before sowing.

NEBRASKA.—*Cass:* Looking well. *Saunders:* Looked well at the beginning of winter since then it has been covered with snow.

CALIFORNIA.—*Alameda:* There is an increase of acreage.

DAKOTA TERRITORY.—*Bonhomme:* Looked well, December 1, since then it has been covered with snow. *Lincoln*: Wheat sent by the Department of Agriculture had made its appearance, looking well when a heavy fall of snow set in. The ground is still covered.

UTAH TERRITORY.—*San Pete*: Never looked better than at this time; weather very favorable.

NEW MEXICO.—*Doña Ana:* Is sown, but only in small quantities.

RICE PRODUCTION.

Material misapprehension of the facts of rice production exists in the public mind. It is stated that rice culture is not extending; that it felt the effects of war's devastation less than cotton, and should therefore recuperate more rapidly; neither of which propositions is true. The rice-planters were driven from the Carolina and Georgia shores during the war, labor was in a disorganized and chaotic state, production had almost ceased; and at its close, dams and flood-gates, quarter-drains and canals, mills, barns and houses, were either dilapidated or destroyed, and the power to compel the laborers to go into the rice swamps was utterly broken. The laborers had scattered, gone into other business, and those obtainable would only work for themselves upon a share contract. Many of the proprietors were dead, and more were absentees; and inexperienced men, from the North or elsewhere, assumed their places. The rice-fields had grown up in weeds and tangled shrubbery, the labor of reparation was discouraging, and the work of cultivation was greatly increased, giving unexpected gravity to the contingencies and accidents of the season.

These difficulties have been gradually disappearing on the Atlantic coast, yet the labor question is still one of great importance. Production is increasing, regularly but slowly. The negroes are becoming accustomed to their quasi proprietorship, and with the aid of capital in

repairing works and replacing structures and machinery, and with protection against foreign competition they will utilize otherwise worthless wastes, and add millions annually to the wealth of the country.

In 1869, the crop of South Carolina, as returned by the census authorities, was 32,304,825 pounds; of Georgia, 22,277,380; of North Carolina, 2,059,281. Production had nearly ceased in 1865. The commercial returns of Carolina rice show an increase as follows: 1866, 21,031 tierces; 1867, 23,482; 1868, 37,047; 1869, 41,172. An increase was also reported in 1870, but the season of 1871 was unpropitious, and the record may show a decrease.

Dr. J. J. Waring, of Savannah, gives local figures illustrating the rate of increase as follows: 1866, 12,500 casks; 1867, 24,337; 1868, 30,795; 1869, 60,146; 1870, 67,736.

In Georgia, two-thirds of the rice is grown in Chatham and Camden Counties; half in the vicinity of Savannah. In South Carolina, nearly half of the crop is grown in Georgetown. The following figures show how small a district yielded the rice of the palmy days of 1859:

South Carolina.	Pounds.	Georgia.	Pounds.
Georgetown	55, 805, 385	Chatham	25, 934, 160
Colleston	22, 838, 984	Camden	10, 330, 068
Charleston	18, 899, 512	McIntosh	6, 421, 100
Beaufort	18, 790, 918	Glynn	4, 842, 755
Total	116, 334, 799	Total	47, 528, 083
Twenty-four other counties	2, 765, 729	Eighty-eight other counties	4, 979, 569
Total	119, 100, 528	Total	52, 507, 652

But the extension of rice culture in Louisiana is a triumphant refutation of the baseless assertion that the business cannot prosper under the most favorable present circumstances. The census exhibits it as follows: 1849, 4,425,349 pounds; 1859, 6,331,257 pounds; 1869, 15,854,012 pounds. The record of M. Bouchereau, by plantations, accounts for a total crop in 1869 of 100,748 barrels of 200 pounds each, or 20,149,600 pounds. The crop of 1870 was not a successful one. In 1859 Plaquemines Parish yielded 4,635,500 pounds of the crop of 6,331,257 pounds, or about two-thirds of the total product of the State; in 1869 the same parish produced 6,247,400 pounds, (record of Bouchereau,) and yet it was less than a third of the crop of the State, and returns were made from 14 other parishes.

The following is the census exhibit of rice production at three decennial periods:

States.	1870.	1860.	1850.
	Pounds.	*Pounds.*	*Pounds.*
Alabama	222, 945	493, 465	2, 312, 252
Arkansas	73, 021	16, 831	63, 179
California	.....	2, 140	.....
Florida	401, 687	223, 704	1, 075, 090
Georgia	22, 277, 380	52, 507, 652	38, 950, 691
Kentucky	.....	.....	5, 688
Louisiana	15, 854, 012	6, 331, 257	4, 425, 349
Mississippi	374, 627	809, 082	2, 719, 856
Missouri	.....	9, 767	700
North Carolina	2, 059, 281	7, 593, 976	5, 465, 868
South Carolina	32, 304, 825	119, 100, 528	159, 930, 613
Tennessee	3, 399	40, 372	258, 854
Texas	63, 844	26, 031	88, 203
Virginia	.....	8, 225	17, 154
Michigan	.....	716	.....
Minnesota	.....	3, 286	.....
Total	73, 635, 001	187, 167, 032	215, 313, 497

The following statement of exports and imports of rice has been furnished by Edward Young, Chief of Statistics in the Treasury Department:

Years.	Domestic exports.			
	Tierces.*	Barrels.†	Pounds.	Value.
1850	127,069	.....	76,241,400	$2,631,557
1851	105,590	.....	63,354,000	2,170,927
1852	119,733	.....	71,839,800	2,471,029
1853	67,707	.....	40,624,200	1,667,658
1854	105,121	.....	63,072,600	2,634,127
1855	52,520	19,774	39,421,600	1,717,953
1856	58,668	84,038	67,616,000	2,390,233
1857	64,332	74,309	68,322,800	2,290,400
1858	64,015	49,283	58,122,200	1,870,578
1859	81,820	69,946	75,070,400	2,207,148
1860	84,163	77,837	81,632,600	2,567,399
1861	39,162	50,038	43,512,400	1,382,178
1862	2,146	7,335	4,221,600	156,899
1863	494	3,496	1,694,800	83,404
1864	.....	5,442	2,176,800	84,217
1865	.....	2,453	983,200	65,105
1866	.....	.....	2,212,901	136,993
1867	.....	.....	1,394,007	100,338
1868	.....	.....	3,079,043	170,357
1869	.....	.....	2,232,833	145,934
1870	.....	.....	2,133,014	127,655

Years.	Foreign exports.		Imports.	
	Pounds.	Value.	Pounds.	Value.
1861	348,900	$10,856	148,550	$3,610
1862	2,339,146	103,738	56,961,317	1,589,109
1863	7,844,068	392,134	61,196,740	1,760,077
1864	7,637,635	452,722	99,691,447	1,911,330
1865	8,290,318	559,465	60,407,756	1,474,393
1866	8,656,060	337,016	76,209,397	2,379,857
1867	4,676,082	180,043	44,782,223	1,219,387
1868	11,908,953	403,941	59,140,707	1,636,492
1869	8,868,664	284,632	54,065,191	1,325,234
1870	15,212,833	454,316	43,123,939	1,007,612

* Estimated at 600 pounds each. † Estimated at 400 pounds each.

In conclusion, these are the facts: The culture of rice is rapidly extending in Louisiana, and may be extended to nearly every parish in the State; it is slowly but surely overcoming its serious hinderances on the marshes of the Atlantic coast; it is mainly carried on by negroes on their own account, as a business in which they have had a life-time training, and its destruction would therefore be a serious calamity to a needy but industrious class of our population; and there is no reason why the home supply of rice should not soon be met without importation. It must be deemed an absurdity, if not a disgrace, for a country like ours to assume the necessity of importing cereals or bread-stuffs in any form.

PROGRESS IN THE BEET-SUGAR MANUFACTURE.

Experiment in the manufacture of beet-sugar in this country is assuming a more systematic and practical form, overcoming many if not all the difficulties confronting profitable production, and apparently laying the foundation for a great industry. It would seem that the

probable future of the business of making beet-sugar must depend mainly on the comparative profit of beet and cane-sugar. The difficulty in the high price and unskilled quality of available labor will ultimately be overcome.

The first large experiment, at Chatsworth, Illinois, was a disastrous failure, financially, from miscalculation, lack of skilled labor, unsuitable soil for the growth of the sugar-beet, and a scarcity of water; yet the sequel of this enterprise, at Freeport, Illinois, with a portion of the same machinery, under different auspices, and with the lessons of the failure well learned, promises successful results. It was under the direction of Mr. Rosentiel; and Mr. Bunn, one of the Chatsworth owners, and J. I. Case, are associated with him in the proprietorship. The location, on Yellow Creek, which furnishes an unfailing supply of pure water, is said to be a good one; and the soil appears to be well adapted to beet culture. We have had no statement of the results of recent work, but have learned that Mr. R. is confident of full success, and of a large extension of business in that vicinity. A dozen factories in the neighborhood, which would mark the locality as a sugar manufacturing section, would intensify greatly the force of the example, and would illustrate far more conspicuously the auxiliary advantages of such an industry to agriculture.

The co-operative enterprise at Black Hawk, Wisconsin, which commenced in 1870, under difficulties, and made 40,000 pounds of sugar, cultivated 200 acres of beets in 1871, and is pushed with a determination deserving of success.

The most successful results as yet have been obtained in California, where two companies are in operation, one producing more than a million pounds of sugar from the crop of 1871, the second year of its operations. This is the California Beet-Sugar Company at Alvarado. The Sacramento Valley Beet-Sugar Company, at Sacramento, also reports comparatively successful results. The San José enterprise is not yet in operation. Mr. S. O. Minor, the secretary of this company, writes that "owing to the fact that we found it impossible to procure a sufficient quantity of the proper seed to start the business, the company could not proceed as contemplated, and we have deferred the organization until sufficient seed can be raised among our farmers here. We managed to procure about two hundred pounds of the seed of the White Silesian, (said to be the best,) which was distributed here, and from which we hope next year to have enough seed to start the business."

The following statement has been communicated by Mr. A. D. Bonesteel, manager of the California Beet-Sugar Company, located at Alvarado:

In the year of 1869 my partners, Mr. A. Otto and E. Klineau, both experienced sugar men, and myself, were successfully engaged in Fond du Lac, Wisconsin, making beet-sugar on a small scale, and for the want of more capital I communicated my ideas as to the feasibility of doing the same in this State to General C. I. Hutchinson, of San Francisco, who at once formed a company with a capital of $250,000, and the result to-day is a factory in Alvarado, in *successful operation*, having the capacity for handling sixty tons of beets every twenty-four hours, and we have the satisfaction of knowing that we have established the fact that beets can be raised in Wisconsin and California containing saccharine matter in sufficient quantities to justify a remunerating price to the farmer for raising and delivering them at the factory, and a margin for profits for the manufacturer.

With respect to the best variety of beets, yielding the most sugar, I should name the White Silesian. For the manufacture of sugar the smaller beet, of which the roots weigh from one to three pounds, are preferred.

The seed is sown by a machine that we manufacture ourselves, which sows four rows at a time. The rows are fifteen inches apart, and when the plant first comes up, we

hoe the rows to keep the weeds down, and then thin out the plants so as to leave the plants eight inches apart. They will then stand in the rows eight inches by fifteen.

Though most countries and climates permit the culture of the sugar-beet, there is of course a choice of soil, if the highest development of saccharine qualities is desired. The root of the sugar-beet penetrates deeply into the ground, and always flourishes best in a deep, rich, loose, mellow, warm, and fertile soil, free from saline and alkaline constituents, not sour, and of a nature little liable to suffer from drought.

The yield per acre, on the average, has been about fifteen tons, although in some cases it has run as high as twenty tons; last year we raised thirty-one hundred tons of beets, and manufactured about five hundred thousand pounds of sugar, and this year we shall make over one million pounds of sugar from the crop of beets that we have raised.

The beet-sugar business in the United States is still in its infancy, and with proper encouragement there is no doubt it can be made one of the best industrial interests we have, as a factory of the capacity of ours gives employment to a large number of hands in the culture and manufacturing the beet into sugar. We are at the present time feeding three hundred and fifty head of cattle from the pulp for the San Francisco market.

If the manufacture of beet-root sugar can be successfully prosecuted in any part of the United States, we claim that it can be done in California. We have the soil and climate, to which we need only add economic labor and experienced men in the business, and the thing is done.

Mr. S. Ehrenstein, superintendent of the Sacramento Valley Beet-Sugar Company, communicates the following facts:

The crop of beets has been very light on our grounds, owing to wrong cultivation. My arrival here in April was too late to enable me to remedy things. We have harvested about 2,000 tons of beets, part of which are, however, not of proper quality for the manufacture of sugar. The extraordinary drought prevented growth; some were quite dried out. The good beets showed, in July, 12 per cent. of sugar, and average now from 13 to 14 per cent. Exceptions show 16 to 18 per cent., which is a great deal more than is ever found in the beets of Europe. By cultivating early, and in the proper manner, I hope to get a good and sure crop for next year, and altogether my short experience here encourages me to entertain the most favorable expectations for the beet-sugar industry in California, provided that the Government continues to protect the industry. The great drawbacks are the extraordinary wages paid here for work and the high prices of fuel and freight.

The factory is furnished with Roberts's diffusion apparatus, well known in Europe to be the best method of extracting sugar. The machinery has been partly imported, because the manufacturers here have no knowledge of sugar machinery. The factory had already been in operation, but in consequence of the peculiar relations with the workingmen, and their want of experience in this industry, great difficulties had to be overcome. After several trials, sixty tons of beets were worked up in twenty-four hours, and the result was satisfactory. The sugar is quite white, without any taste of beets, and can be sold as readily as the best cane-sugar. We sell only two kinds for consumption, A and B; the colored second produce is worked over again.

The beets have been raised from German and French seed. The former is preferable for this country, because the beets grow downward into the ground, and do not show any green tops. It is the White Silesian beet. Double the quantity of seed is needed here per acre that is required in Europe, because a great deal of it does not come up, in consequence of the bad cultivation of the ground. The outlay is consequently very heavy, and cheap importation an important item. A sandy loam, with moist sub-soil, is the best here for beets; better than a heavy soil, which is often saltish, or has water-tight layers of clay under it, shutting off the water, and causing the beets to dry.

THE POTOMAC LANDS.

The central location of the lands of Northeastern Virginia, the wonderful facilities afforded for water communication with the principal cities, their climatic advantages in fruit-growing through the modifying influences of large bodies of deep water, and the variety found in the soil itself, contribute materially to a true estimate of their intrinsic value, which will only become fully apparent when improvement shall have unfolded something of their real capabilities. The abundance of sea-

weed on the shores, the plentiful supply of material for home-made fish-guano, the cheapness of oyster-shell lime, and the underlying marl so accessible through all this region, offer fertilizers in great variety and practically unlimited quantity, precluding the necessity of the more costly commercial fertilizers, and enabling the farmer to increase at will the fertility of his lands.

People begin to think that it may be poor economy to grow corn at ten cents per bushel on cheap western lands—say eighty bushels for $8—when lands might be had at $30 to $50 per acre, in some places for $10 to $20, that will produce fifty bushels, worth $40. The soil is generally a loam; in some places a sandy loam of fine texture and full of organic matter; in others, a clay loam, retentive of moisture and of manure. It is a light, quick soil, which literally shoots into perfection all sorts of products. The climate is propitious, giving earlier results by from two to four weeks than Delaware and New Jersey. This fact, connected with that of remarkable facilities for cheap and rapid communication to Baltimore and the more northern cities, makes this region the paradise of "truck" growers. The same cheapness of transportation gives value to the timber, much of which is heavy, making cord-wood, formerly a drug not worth marketing, a valuable commodity.

We refer to a record of a visit once made to a tract which may be taken as a sample of these Potomac lands:

Very little expense has been incurred for fertilizers. Twenty bushels per acre of cheap gas lime had been spread upon the grass land, and the crop is evidently fairly estimated at two and a half tons per acre. The corn was planted late, but its germination and growth have been marvelous. The soil is a fine clay loam, in some places with more of silex, never stiff and heavy, and never inclining to "bake" under the influence of heavy rains and hot sun. A little further on, on the lightest soil to be found, are peach trees, put out four years ago, large enough for six years growth, perfectly healthy and vigorous, and full of fruit. In the distant wood is one of those blemishes upon Virginia agriculture, an old field, exhausted and abandoned. Examination reveals the fact that the exhaustion is skin deep; the surface had been scratched over, in former years, and spitefully turned out to grass and weeds, upon refusal to yield undiminished returns with so negligent culture. The soil immediately below the surface has long been unstirred. It contains in a fair degree the elements of fertility, and the subsoil differs little in appearance, being a little more crude, uninfluenced as it is by air and frost. An inch or two deeper plowing, and a little lime to correct its acidity, would make it comparatively a productive soil, and a green manuring of clover would make it better still. For fruit, sweet potatoes, melons, and market gardening generally, it would produce largely. For grass it is scarcely surpassed, in quantity or quality. Wheat yields a valuable crop, and corn grows luxuriantly.

The following letter from Mr. Chalkley Gillingham, of Accotink, Virginia, a pioneer in the development of the capabilities of these soils, in a colony upon a part of the original estate of General Washington, in the vicinity of Mount Vernon, gives a brief statement of the results of that enterprise:

In the latter part of the year 1846, four or five others besides myself purchased the "Woodlawn" estate, (a part of the original Mount Vernon) then a neglected estate of 2,000 acres. There was not one white person upon it. Our intention was to form a settlement of people alike in habits and sentiments. Others were expecting to join us in the experiment. The first thing we did after the purchase was to come down to the property and bring a surveyor with us, and we laid off the whole into lots of 50 to 150 acres each. There was a very large substantial brick mansion-house on the premises, tenantless. We set off 400 acres with the mansion-house, the balance in small tracts; half of the whole estate was in timber. We introduced farmers, mechanics, and laborers. Four of us joined together in copartnership, built a large saw-mill, and repaired an old flour-mill on an adjoining property, which we bought within the first year, and commenced sawing up the timber and grinding grain. The timber went to Philadelphia, Bath, Maine, and other places; the flour, after supplying the colony, went to Alexandria and Washington, and the North. Our mills were at the mouth of Accotink Creek, at tide-water, where vessels could load at the mill. A few of the other members of the colony took small farms to themselves; the remander of the land for the time being was worked

and improved by the four who were associated together and who were owners of the main part of the estate, from which lots were sold off as fast as settlers came in; the whole estate is now worked in small farms. The 400 acres left with the mansion-house is now divided into five or six lots or farms. We commenced our farming improvements by moderately deep plowing, thoroughly done, using guano freely as a fertilizer to commence with, in order to get straw and other vegetable matter with which to make other fertilizing materials to follow. But we find lime to be the cheapest and most enduring fertilizer we can employ, after getting vegetable matter into the soil. Our general farming is a rotation of corn, potatoes, or oats, and wheat, then grass, which latter, with corn, are the principal crops. We have considerable land devoted to small fruits and orchards and nursery, which we find more profitable hereaway than general farming. While a crop of wheat will only yield 15 to 30 bushels to the acre, worth $1 to $1 50 per bushel, or $30 to $40 per acre, a crop of strawberries, or other small fruits, will yield from $100 to $250 per acre. Orcharding I consider to be profitable. We have many hundred apple and peach trees. The apple orchards are most of them too young to show what is the best they can do, but, from our experience thus far, I believe apple-raising will be quite remunerative. The fruit in most instances is very fine. I have examined, studied, and experimented much the past twenty-five years to ascertain the kinds best adapted to our climate, soil, and other circumstances, and think I have succeeded with a list sufficiently large for all practical purposes. The people of this region have been heretofore misled, particularly with winter or long-keeping varieties, having obtained their trees from the North and planted such varieties as are popular there, (and the fruit from which they have eaten here imported from there,) which has proved a failure when grown here. We find varieties originating here and south of us to be the proper varieties for long keeping; we therefore obtain such varieties from trees originating here, and in North and South Carolina and Georgia, such as the Abram, Milam, Limbertwig, Rawle's Janet, Prior's Red, Meade's Keeper, and Boling's Sweet, of Virginia; the Wine-Sop and York Imperial, of Pennsylvania, have an equally high meed of praise; the Cullasaga, of South Carolina, and several others of less note, and still less known, of North Carolina and Georgia. Last, not least, is pear culture, which succeeds most admirably in our soil and climate; and the old varieties, which seem to have run out as by exhaustion in more northern latitudes, succeed here to admiration. I will give you a list of such as I find to be very desirable, viz: Bartlett, Seckel, White Doyenne, (Butter, Virgalieu, St. Michael's, of the North,) Duchess d'Angoulême, Louise Bonne de Jersey, Flemish Beauty, Buerre de Anjou, and many others of nearly the same claims for superiority.

SWAMP-LAND RECLAMATION.

The work of reclaiming overflowed or swamp lands is progressing in California. A mine of wealth is opened in such improvements, by which lands obtained at the average rates of Government sales of public lands of all grades are transformed, at an expense usually not exceeding five dollars per acre, into the richest and most manageable of tillable areas, having the added advantage of almost perpetual sunshine above, and a never-failing supply of water beneath, securing results in production almost unexampled. Information has been received of the organization of a company of San Francisco capitalists who have purchased 40,000 acres at the northwest end of Lake Tulare, in Tulare County, at $2 50 per acre, and will immediately inaugurate measures for its reclamation. Negotiations for 25,000 acres adjoining are also in process.

Marsh and tide lands in Alameda have been sold to the value of $40,086. The overflowed lands on the eastern shore of San Francisco amount to 20,000 acres.

In Contra Costa County, on the south bank of the west channel of San Joaquin River, a strip of low lands 25 miles long, requiring a levee only on one side, contains 15,000 acres, valued at $100 per acre. On a portion of this tract 25,000 sheep have been grazing; another portion (of 10,000 acres) has pastured 11,000 head of cattle, and weekly shipments of beeves have recently been made from it to San Francisco. It is believed there that six to nine tons of lucern can be produced per

acre on this land. On 5,000 acres it is proposed to grow a crop of wheat the coming season. These tule lands are prepared for culture by burning. The tule and grass are set on fire and rapidly consumed, and the soil itself is burned to ashes to a depth at which the fire is checked by moisture, leaving several inches of light ashes and charred soil on the surface. The level of the land is often lowered by this process from four to six inches. No cultivation is required, but the seed is sown on the surface, and the harrowing is accomplished by turning on a flock of sheep, which is subdivided into sections of 200 to 300 each, and driven systematically, each by a boy and a shepherd's dog, until the ground has been thoroughly tramped over. In harvesting, there is too much grain left upon the ground for seed; so the sheep are again brought into requisition to feed upon a portion while they tramp in the remainder.

Twitchell Island, south of Brannan Island, containing 3,600 acres, was leveed in 1870, but not in season to dry it in readiness for burning, with the exception of 1,000 acres, which were sown in wheat. The product of that wheat crop is reported at $67,700, which is just $300 less than the purchase-money for the whole island. Besides the wheat, vegetables to the value of several thousand dollars were grown upon the same tract. A large area in the center of the island has been burned, preparatory to seeding and tramping, while sheep are fattening upon the wasted grain left upon the area in wheat in 1870.

On Sherman Island, the reclamation of which has been heretofore reported, immense crops are now grown. One field in 1871 is said to have yielded 60 bushels of barley per acre, and afterward two crops of Chili clover one and a half tons each per acre. Another field, according to the report, brought 45 bushels of wheat per acre, one and a half tons of clover, and feed for cattle in the autumn.

The number and character of these enterprises are worthy of special investigation. Some companies propose to reclaim very large areas, in one case about 80,000 acres. After reclamation these tracts are cut up and sold, sometimes in bodies of hundreds of acres, often in small farms, the lapse of time promoting further subdivision, which will ultimately secure a dense population and the highest culture.

DEPARTMENT BULLETIN.

A convention of delegates, representing the interests of the State agricultural and horticultural societies, boards of agriculture, and agricultural colleges of the United States, will meet at the city of Washington, on Thursday, the 15th of February next, to confer upon subjects of mutual interest, and to take such action as shall be deemed expedient for the promotion of agricultural education, and to secure a more intimate connection between the Department and the several institutions mentioned. The meeting will take place in one of the rooms of the Department building, at 10 o'clock in the morning. The call for this convention was issued by the Commissioner of Agriculture after a full interchange of views with officers of agricultural colleges, and with other prominent agriculturists.

The Department is now receiving, principally for distribution to the South, in liberal portions, for experimental purposes, improved varieties of field and sugar corn, field and garden peas and beans, Italian rye-grass, *Bromus Schraderi*, and lucerne; mangel-wurzel and sugar-beet,

cabbage and onion seeds. It will also receive, during this month, fresh seeds of the ramie and jute plants, the latter of which cannot be grown successfully north of Tennessee. Oats and barley of approved varieties have been ordered from Scotland and Germany, and will be distributed in ample time for spring-sowing. A choice variety of white spring-wheat, grown in Oregon from seed imported from Australia, has just been distributed to the Northwestern States and Territories.

The Department has also just distributed a quantity of Cooley's early white field-corn to a selected list of farmers in the different States, who will make a trial of it in their respective localities, and report the results of their experiments at the close of the year. This corn is a new variety, originated by Mr. C. C. Cooley, of Manchester, Adams County, Ohio, and introduced to the public in the fall of 1870. It is said to be remarkable for its early maturity. Mr. Cooley states that he planted it the past season on the 3d of May, and it was ripe and ground into meal the 9th of August, the time of its growth having been fourteen weeks. A farmer in Wisconsin is reported to have raised a crop and had it ground into meal in thirteen weeks from the day of planting. Another, in Minnesota, raised fifty bushels from one pint and a half of seed. Mr. Cooley claims that this corn is equal in productiveness to any variety in cultivation.

As there is much inquiry in the Southern States for seed of the Japan clover, it is deemed proper to republish, from the Annual Report for 1869, the following opinion by the Superintendent of the Garden and Grounds of the Department: "*Lespedeza striata* (Japan bush-clover) is a leguminous plant that has lately attracted some attention in the Southern States as a forage plant. It is poorly adapted to any such use, and not by any means worthy of recognition by the cultivator. It is a low, hard-wooded annual, spreading freely on sandy and poor soils, with very small and scanty foliage."

CHEMICAL NOTES.

Dr. Ryland T. Brown has been appointed chemist of the Department of Agriculture, and entered upon the discharge of his duties, January 11. He has not had sufficient time to make any extended chemical analysis, and therefore has no report to present this month. He found the laboratory in charge of an assistant, Mr. Henry M. Smith, who presents the following notes of his analysis of yaupon (*Ilex cassine*) or Carolina tea. This plant is of special interest to the people of the United States, as it belongs to the family which is, chemically, the American representative of the tea of Asia and the coffee of Africa.

REPORT ON YAUPON.

The Department is indebted to Mr. J. E. Reside, of Washington, District of Columbia, for the opportunity of analyzing a specimen of this interesting plant. "Yaupon" was the name given by the Indians to the leaves of the *Ilex cassine*, which formed an important article of commerce between the different tribes. Mixed with the leaves of other species of the same plant, (*Ilex vomitoria*, Aiton, and *Ilex dahoon*,) it formed the basis of their famous "black drink," which was used by them as a medicine; and at one of their peculiar religious festivals was taken, a pint at a time, at short intervals during two or three days, to serve as an emetic, to thoroughly purify their bodies before undertaking one of their protracted expeditions. The emetic effects were more probably due, how-

ever, to the large quantities of the very strong and bitter decoction than to any peculiar active principle contained in the yaupon, for strong black tea will sometimes produce the same effect under similar circumstances. Yaupon is found along the coast of the Southern States, from Florida to North Carolina; it is not known to grow in the interior.

The specimen received for analysis weighed about half a pound, and was apparently composed of the dry and broken leaves, and small twigs of the plant. The preliminary analysis gave:

Moisture, (determined at 140° C. in an atmosphere of carbonic acid)	7,595
Organic matter	88,470
Ash	3,935
Total	100,000

Treated with the usual solvents, it yielded the following results:

Soluble in ether	6.96
Soluble in alcohol and insoluble in water	4.84
Soluble in cold water and insoluble in alcohol	8.24
Soluble in both alcohol and water	10.15
Soluble in hot water containing 5 per cent. hydrochloric acid	15.28
Insoluble	46.93
Moisture	7.60
	100.00

The more important proximate principles having been separated and weighed, the following percentage of each was obtained:

Volatile oil	0.011
Wax and Fat	0.466
Resin	3.404
Chlorophyll	2.491
Caffeine, (Theine)	0.122
Tannic acid	2.409
Coloring matter, etc., soluble in alcohol, insoluble in water	4.844
Extractive matter, insoluble in alcohol, (Gum, Pectin, etc.)	8.244
Extractive matter, soluble in both alcohol and water	10.149
Starch, Pectose, Tannin, etc., soluble in hot dilute hydrochloric acid	15.277
Nitrogenous matter, insoluble in water, (probably Legumin, combined with Tannic acid)	8.138
Woody matter	34.854
Moisture	7.595
Ash	3.935
Total	101.939
Nitrogen	1.302

The volatile oil has a very agreeable odor, faintly resembling that of raw tobacco, but having also a tea-like smell. The small quantity of yaupon available for analysis, prevented any extended examination of the physical characteristics of this oil. It was apparently quite soluble in water, and a quantity scarcely weighable gave an agreeable odor to a large volume of that liquid.

The large percentage of resin is worthy of attention, as it is probably derived from the oxidation of the volatile oil, and it suggests that the aroma and medicinal properties of the tea might be improved by a more careful preparation of the leaves. The large amount of woody matter, derived from the small twigs, etc., confirms us in this opinion.

The amount of caffeine (the alkaloid of coffee and tea) is not large, ordinary Chinese tea containing from 2.5 to 6 per cent. Paraguay tea (*Ilex Paraguayensis*) contains, according to Stenhouse, 0.13 per cent. of caffeine, which is almost precisely the same amount as was found in

yaupon. In the extraction of the volatile oil; by boiling the substance with water, and extracting the oil from the distillate with ether; a trace of caffeine was found with the oil; proving that this alkaloid is carried off mechanically when tea or coffee is boiled.

The percentage of tannic acid only includes that dissolved by ether; another portion exists in the insoluble residue, probably combined with legumin.

Yaupon is used by many persons in the South as a stimulant and as a substitute for intoxicating liquors; and it is also said to be very grateful to inebriates who are curing themselves of their love of liquor.

As the physiological effects of tea and coffee are due to the joint action of the volatile oil, caffeine, and the tannin which they contain, it may be well to compare the percentages of these substances found in yaupon, with the results obtained by other chemists in their analyses of tea and coffee:

	Yaupon.	Maté, or Paraguay tea.	Black tea, average.	Green tea, average.	Green tea.	Coffee.
		Stenhouse.	Mulder.	Mulder.	Peligot.	Payen.
Volatile oil	0.01	.....	0.63	0.88	0.50	0.003
Caffeine	0.12	0.13	0.56	0.52	6.00	1.00
Tannin	2.41	.....	2.04	17.68	14.00	10.00

By comparing these figures it will be evident that yaupon is about equal to maté (Paraguay tea) in the amount of caffeine which it contains, and that it is far below either tea or coffee in its percentages of valuable constituents.

It is very probable that several other indigenous plants may contain caffeine—for example, common holly, the black alder, and the "inkberry" plant—and it is proposed to test these as soon as proper samples can be secured.

ENTOMOLOGICAL RECORD.

DESTRUCTIVE GRASSHOPPERS IN CALIFORNIA.—A letter written in June, 1871, from Mr. Alexander S. Taylor, of Santa Barbara, California, giving a very interesting account of the ravages committed in that State by the Pacific migratory locust or grasshopper, which he erroneously supposed to be merely a variety of *Caloptenus spretus*, (Uhler,) but which has been decided to be *Œdipoda atrox* of Scudder, (Fig. 1,) by Rev. Cyrus Thomas, who has made this family his especial study. Mr. Taylor writes that "this year the insect appeared simultaneously in the Salinas, San Joaquin, Los Angelos, Sacramento, and Santa Barbara Counties, in May and June." In Mr. Scudder's notes on the *Orthoptera* collected by Hayden's Geological Survey in Nebraska, we find the species mentioned and described, and in the same article Mr. Scudder gives quotations from Mr. Taylor in the Smithsonian Report for 1858, and from the California Farmer, of January 15, the same year, from which it appears that the insect was exceedingly numerous and destructive before the present season. In July, 1865, the Sacramento Union stated that for

Fig. 1.

about three hours in the middle of the day the air, at an elevation of about two hundred feet, was literally thick with them and great numbers fell in the streets, absolutely taking the city by storm; they then commenced their wholesale destruction of everything green in the neighborhood, and their flight en masse resembled a thick snow-storm, and their depredations the sweep of a scythe. In the year 1855, in the North Sacramento Mountains they are said to have been "as thick in the heavens as flakes of snow in a wintry storm," and in the Sacramento Valley, "whole orchards, gardens, and vineyards were consumed by them; entire fields of young grain, of crops, and vegetables, were eaten up within the space of a single day, leaving the ground like a wilted, blackened desert, and, in some parts of the valley, they annoyed the passengers and horses of the public stages to such an extent as to cause the greatest inconvenience, and appear, in some cases, to have positively endangered human life."

A gentleman residing in Colusa County, in the Sacramento Valley, in the summer of 1855, informed Mr. Taylor, "That these insects appeared to rise out of the eastern boundary of the valley, where it is hot, dry, and sandy, and that on some days they filled the air so as to obscure the sun; they consumed all garden vegetables, the leaves and bark of the elder tree, and the young leaves and bark of the small branches of cottonwood, willow, and even the soft green parts of the tules or bulrushes in Stony Creek. In Colusa County their dead bodies were seen, at one time, completely covering the surface of the water for miles in extent. In some parts of the valley they ate through gauze and textile coverings of all kinds, which had been used to shield animals and plants from their attacks."

From Mr. Taylor's account in the Smithsonian Report for 1858, it appears that there are at least three species of grasshoppers or locusts, in California and Oregon, which are very injurious to the crops, but as there are no names or accurate descriptions given, it is extremely problematical which of them it is that does the most injury. At the same time his letters were written to the Department, however, he sent two bottles of the insect figured (see Fig. 1) as specimens of the grasshopper he wrote about, and named them the Pacific Migratory Locust, and he says it is undoubtedly an indigenous species, as it was known to the early colonists and missionaries as far back as 1730.

Fig. 2.

This grasshopper, or locust, is a little over an inch in length; is of a pale brownish yellow color, with several small, roundish, brown spots, and a large brownish mark on the upper wings, and a dark fuscous spot behind the eye. It bears a very strong resemblance to *Œdipoda pellucida* (Scudd.) of New England. Indeed had these locusts not come from California direct, and from good authority, they might readily have been mistaken for the last-named insect. It does not appear that any steps have yet been taken to destroy these insects in California, but the same remedies used for destroying the *Caloptenus spretus*, (Uhler,) or hateful grasshopper, might be adopted. It is of great importance to find out where they live when young and in the wingless state, as it is at this time—or when in the egg, just below the surface of the earth—that they may be destroyed most readily.

There are three grasshoppers or locusts very similar in size and form, now known greatly to injure the crops in the United States, and we give figures of them all in order that our readers may be able to recognize them. First is the *Caloptenus spretus*, Uhler, (Fig. 2,) or western species, (Agric. Rept. 1870, p. 76,) commonly known as the hateful grasshopper, and found in the States west of the Mississippi, and in the Rocky Mountains, in immense swarms, and which is distinguished by its length of wing from the second, or common eastern species, *Caloptenus femur-rubrum*, Har., (Fig. 3,) the red-legged grasshopper, which has shorter wings, but otherwise is almost identically the same as the above; and lastly, *Œdipoda atrox*, (Scudd.,) the Pacific species mentioned, and figured at the beginning of this article.

Fig. 3.

A NEW REMEDY.—Theodore Day writes to the Department as follows:

> The striped cucumber beetle (*Diabrotica vittata*, Fab.) did not trouble me much last spring, but, after frost killed the vines, I noticed plenty of them on the soft pumpkins, and went round and killed them. If they gather so every fall, I think it would be a good plan to leave a few soft pumpkins, and then go around every pleasant day and destroy the insects collected upon them.

Might not this plan work to advantage with the common squash-bug, *Gonocerus tristis?* It is at least worthy a trial.

EGG-PLANT PESTS.—Dr. E. Foster, of Louisville, Mississippi, sends a number of insects, which he complains of as very injurious to egg-plants. It proves to be one of the blister-flies, *Epicauta marginata*, (*cinerea* of Lec.,) which feeds upon the foliage of butter-cup, potato, &c., but it has never before been accused of injuring egg-plants.

SCIENTIFIC NOTES.

ABSORPTION OF MOISTURE BY LEAVES.—Mr. M. Cailletet has lately been investigating the question as to whether the leaves of plants are capable of absorbing water in a liquid state; and sums up the result of his experiments, by stating that the fact seems to be demonstrated that a plant growing in a humid soil and receiving by its roots the quantity of water necessary to its normal condition, does not absorb the water which moistens its leaves, but that such absorption takes place as soon as the leaves begin to wither, in consequence of the dessication of the soil. In this way he explains the phenomenon of certain plants maintaining a healthy condition without any contact with the soil, and even absolutely isolated from all assimilable substances. Thus, a specimen of *Pourretea* a rootless Bromeliaceous plant, maintained a healthy existence and exhibited considerable increase in weight, while suspended for more than six years in the air by a wire. No moisture ever reached it except that from the garden syringe, and yet it was continually putting out new leaves and flowering abundantly.

COMPOSITION OF THE ALBUMEN OF EGGS.—The albumen of the white of egg has lately been shown to consist of two distinct varieties; one having its maximum point of coagulation at 63°, the other at about 74°. In addition to these there is a case in substance, one known

as lactoprotein. According to Gautier, when albumen of egg is treated with water at 150°, it yields the following products, which pass through a dialysis, besides insoluble matters: 1. Substance having the properties of casein; 2. A substance analogous to hypoxanthine; 3. An albuminoid substance.

USE OF CAUSTIC BARYTES IN SUGAR-REFINING.—Dr. George Lunge publishes in Dingler's Polytechnic Journal an account of his method of using caustic barytes for the separation of the sugar from molasses in the sugar-refinery; this, in his view, being one of the best methods known, since it forms an insoluble combination with the sugar, which can be again decomposed, by means of carbonic acid, into insoluble carbonate of barytes and soluble sugar. The details of the process are too technical for our columns; but this reference to the article may be of service to some of our readers.

DESTROYING MOLD IN CELLARS.—According to Dr. Wiedehold, fungus growths in cellars may be combated either by burning sulphur or by pouring two parts of concentrated sulphuric acid over one part of common salt. In the first instance, sulphurous acid gas is produced; and in the second hydrochloric acid, by means of which the fungi are destroyed. It is sufficiently evident, however, that during this process all openings must be closed, so as to prevent any escape of the gas, and the greatest care exercised not to enter the cellar after the operation until it has been thoroughly ventilated.

DIFFERENCE IN THE ASH OF GRAPE AND OTHER FRUIT WINES.—According to Dr. Tuchschmid, the difference in the ash of combustion of grape wine and of fruit wine, may be used as a convenient mode of detecting the adulteration of the former by the latter; since, while fruit wine contains 1 to 4 tenths of carbonate of lime, grape wine, at the highest, contains only about 5-hundredths.

LIMING FRUIT-TREES.—The periodical liming of fruit-trees is generally considered as serviceable, especially in keeping down the ravages of the insects which find their home in the fissures of the bark. It is also important that the operation should be likewise extended to the main branches. For the purpose in question, white-wash has generally been used, causing a decided whiteness of the tree, which is objected to by many persons on the score of the unsightly appearance and the readiness with which the lime becomes detached. It has been shown, however, by experience, that the same beneficial effect results from the use of colorless lime-water, which every one knows how to prepare with unslacked lime, and which, when settled and become clear, can be poured off and used as above indicated. In this way repeated applications can be made without affecting the appearance of the tree.

CAUSES OF THE ROTTING OF FRUIT.—According to Decaisne, the rotting of fruit is produced by two microscopic fungi, which develop in moist, confined air; namely, *Mucor mucedo* and *Penicillium glaucum*, infinitely minute germs of which are continually floating in the atmosphere, and which attack more especially any injured or abraded portion of the surface. If, now, the fruit be wrapped up in cotton, or with soft tissue-paper, or, still better, with waxed paper or tin-foil, the introduction of these germs will be prevented, and the fruit can be kept for a long time without any appreciable change.

INFLUENCE OF FOOD ON THE QUALITY OF PORK.—As the result of experiments in England upon the influence of food upon the quality of pork, it is stated that pigs nourished with milk give the best-flavored meat and the greatest weight; next to which come those fed with grain, maize, barley, oats, and peas. Potatoes furnish a loose, light, tasteless

flesh, which wastes away very much in cooking; while that of animals fed upon clover is yellow and of a poor flavor. Oil-cakes and oil-seeds produce a loose, fatty flesh, of an unpleasant taste; beans a hard, indigestible, and unsavory meat; and acorns are but little better.

PREVENTING THE GERMINATION OF POTATOES IN CELLARS.—Much trouble is experienced by farmers and others who have occasion to store potatoes for a considerable length of time, in preventing their germination, and consequent depreciation in value as food; and our readers may be interested to know that experiments, prosecuted in Germany, have shown how this may be measurably prevented. This is accomplished by exposing the potatoes to the vapor of sulphurous acid, by any of the various well-known modes, and a large mass of potatoes can be treated at one time. This process, if not entirely effective in accomplishing the object, will retard or modify the sprouting of the potato to such an extent as to render the injury caused thereby very slight. The flavor of the potato is not affected in the least by this treatment, nor is its vitality diminished; the action being simply to retard or prevent the formation and growth of the eyes.

ABSORBENT POWER OF SOILS.—We hear more or less now-a-days of the "absorbing power of the soil;" this referring to that peculiarity by which the various soluble substances, particularly, however, inorganic, and among them a series of plant nutrients are so deposited or held that their solution, filtered through the earth, emerges much poorer in these substances, in consequence of this filtration, than when entering. A proof of this property in the soil is shown by a simple experiment, which consists in filling a bottle (having a small hole at the bottom) with fine river sand, or dug and sifted garden earth. If, now, dung-water, quite offensive in smell, be poured into this gradually, until the whole mass is saturated with the liquid, this, on emerging from the lower opening, will appear colorless and odorless, the peculiarities of the water being entirely changed. It is certain that this property, possessed by soils, of attracting soluble substances from their solutions, has a very important influence upon the practice of agriculture, although much remains to be done in order to utilize it. This much is certain, that the finer constituents of the soil, especially the clay and humus, possess the property, partly by capillary attraction and partly by chemical transmission and exchange, of attracting definite quantities of soluble plant-nutrients, especially ammonia, potash, phosphoric acid, and sulphuric acid, and other salts, and from dilute watery solutions to make them so much less soluble that they can only be extracted again, very slowly, by the long-continued action of water. It is to this that we owe the fact that the substances most important for the nutrition of plants are not continually removed from the soil by the rain, and that putrescent or offensive liquids undergo a purification by striking through the earth; that with insufficient manuring, clay soils lose their fertility more slowly than sandy soils, &c.

The absorbing power of the soil appears to be in direct proportion to its adhesiveness; and as sandy soils possess this peculiarity in a less degree, the manures applied to them pass off more readily, to the injury of vegetation. This fact has been acted upon for a long time, since it is the practice to apply a slight but oft-repeated manuring to sandy soils, while with the heavier soils the reverse may be the case.

SCARCITY OF SMALL BIRDS IN FRANCE.—A recent writer in Les Mondes remarks upon the great scarcity in France during the present year of small insectivorous birds, and ascribes this to the extreme rigor of the preceding winter, which caused myriads of the feathered

tribes to perish with hunger and cold. The consequences of this scarcity, according to the writer, were very soon manifested in the unusual amount of devastation caused by the caterpillars, which, not satisfied with devouring the leaves and young shoots, have even eaten into the wood, fruit trees being attacked in preference to others, and to such an extent that many orchards and groves in May were as destitute of foliage as at Christmas.

PROPER METHOD OF STORING POTATOES.—According to the English Mechanic, potatoes should always be stored in as dry a state as possible, and should any disease be discovered among them, small quantities only should be pitted together; certainly not more than thirty bushels in each pit. In the center of this pit should be placed a lump of lime about the size of a man's head, and before covering them in they should receive a good dusting of quick-lime. The lime absorbs the moisture during the time the potatoes sweat, and by so doing prevents the tubers from overheating, while its application also greatly improves the quality of the potatoes, no doubt absorbing much of the water from the tubers, and consequently making them more mealy than if pitted without lime. After the potatoes have been lying in the pit for at least a month, they should be carefully looked over, and may be placed together in one or more large pits, in the center of which should be placed a large basket of hard lumps of lime, or, should the pits be in the form of long trenches, it will be well to place other baskets at about twelve feet apart. The whole heap should also be well sprinkled with lime before covering it. The pits should be made low and narrow, as they are thus less liable to heat than if made wide and high.

PREVENTING IRON GARDEN-TOOLS FROM RUSTING.—It is said that if iron garden-tools are laid for a few minutes into a solution of soda, they will be protected from rusting for a long time, even if exposed continuously to a moist atmosphere.

UTILIZATION OF LIQUID SEWAGE.—A contract has recently been entered into by the police board of Glasgow for the supply from the public urinals of 5,000 gallons of liquid sewage per day, for the sum of 1,000 pounds sterling per annum. This substance is to be subjected by the purchasers to a chemical treatment for the purpose of converting it into sulphate of ammonia.

SPECIFIC-GRAVITY TEST FOR POTATOES.—A simple test adopted in Germany for determining the comparative value of different samples of potatoes as food, consists in the use of a saline solution of a certain strength, in which the potatoes are placed, and observing the depth to which they sink. Those which sink the deeper, and especially those that settle to the bottom, are the more valuable varieties; while the poorer qualities float at the top. As this method depends for its principle upon the fact that the amount of the starch in the potato is in the ratio of its specific gravity, a much simpler method of getting the absolute value consists in subjecting the potato directly to the ordinary specific-gravity test, and making the comparisons accordingly.

DEPARTMENT REPORT ON THE PREPARATION OF TIMBER.—A valuable report has just been published by the Engineer Department at Washington, as prepared by Captain T. J. Cram, upon the decay of timber, and the methods for its preservation for military and engineering purposes. The experiments of Captain Cram have tended to show that, for a limited period at least, creosoting the timber before immersing it in sea-water is practically a preservative against the attack of boring mollusks or crustaceans as well as ordinary decay, the trial hav-

ing now lasted, in some instances, for as many as twenty years, without any apparent change in the wood.

This is in confirmation of the special report of the Academy of Sciences of Amsterdam, upon experiments made by the direction of the Netherlands government. Similar experiences seem to have resulted from the creosoting of wood for railroad purposes, as well as for gun-carriages and other engines of warfare.

The report of Captain Cram discusses the general theory of the application, and the methods of subjecting wood to the desired treatment; and it is maintained by him that its application to breakwaters, Government wharves, piers, and other Government constructions on the lakes, and on the sea-coast, will result in an enormous saving of expense. General Gilmore, in an appendix to the report, expresses his opinion that the Bethell process, with its American modification of the Seeley & Robbins processes, is cheaper and more effective than any other, this consisting essentially in impregnating the timber by boiling it in coal-tar with carbolic acid.

Rust in wheat.—It is at present well established that rust in grain is produced from the spores of a microscopical fungus growing upon the barberry and various rough-leaved plants, alder, &c. These, falling upon the leaves of the cereals and other grasses, develop very rapidly, and in turn yield the summer spores of a similar character, by which the affection is propagated with inconceivable quickness. The winter spores, which are produced last, form on the first-named plants other fungus growths the next year, and thereby secure the continuance of the rust from season to season.

The proper methods of preventing grain from taking this affection, consist, first, in extirpating the barberry and other trees mentioned from the vicinity of the grain-fields; next, the grain should be cleaned with the utmost care, so that no seeds of the fungus-bearing plants may be introduced into the field in the sowing, and thus aid in the development of the disease; and finally, no manure should be applied to the grain-fields in which any straws are mixed that have come from rusted plants, and, in fact, straw of this character should be burned as the most effectual method of protection against the spreading of the disease. If used at all as manure, however, it should be kept for grass-lands or fields in which grain is not raised.

Water glass for budding trees.—An important use of water-glass is made in budding trees, for which purpose it is to be mixed with finely powdered whiting or finely sifted chalk into a paste, and the wounded parts of the tree covered with it. In this way the exposed surfaces will be completely protected against the action of the weather, and by timely application and proper manipulation all injurious results from the operation may be avoided.

Extraction of ammonia from the atmosphere by humus.—In the course of certain experiments made by Bretschneider upon the extraction of ammonia from the atmosphere by humus substances, he came to the conclusion that the anitrogenous, brown, organic combinations which are obtained by boiling a solution of sugar with dilute sulphuric acid have the property, when moist, of extracting ammonia, in a dry season, from an atmosphere poor in ammonia; second, that this absorption of ammonia, although relatively slight, is yet incomparably greater than the power of absorption of a surface of water for the ammonia contained in the atmosphere, and also incomparably greater than that of moist quartz; third, if the brown combinations are mixed in ascending proportions, without quartz, so that the former constitute 1, 3, and

5 per cent. of the weight of the latter, the moist mixtures of the same surface have a disproportionately great power of absorption for the ammonia of the atmosphere in a dry season, and increasing more than proportionally with an increasing amount of ulmin.

EUCALYPTUS TREE.—Much success seems to have been experienced in the introduction of several species of *Eucalyptus* from Australia into various parts of Europe and California; and it is probable that in this plant we may have a very important addition to our material resources. Its great merit consists primarily in its adaptability to regions otherwise unsuitable for the growth of forest vegetation, in the extreme rapidity of its growth, and in the great value of the wood for economical purposes. When planted in marshy land, it has a very decided effect in draining the soil, and freeing it from a malarious tendency; while it is said to thrive where the annual rain-fall is scarcely sufficient to keep ordinary trees in proper vigor.

In one case, a specimen raised in Algiers had attained, at the end of eight years, an elevation of nearly thirty-five feet, and a circumference of five feet at a distance of three feet from the ground. In Australia it reaches enormous dimensions, equaling if not exceeding in height, though not in circumference, the far-famed giant trees of California.

As is well known, trees having this rapid growth are generally soft and spongy, and of comparatively little value for timber; but the *Eucalyptus* is quite the reverse, the wood being very heavy and hard, resisting the action of air and water, as well as of most kinds of insects. In general properties it resembles the wood of the oak, and it is employed very largely for ship-timber in Australia. The growing plants disseminate an aromatic fragrance, which is supposed to be conducive to health. This is due to the volatile essential oil, which can be readily collected, and is known as *eucalyptol*. The leaves furnish 2½ per cent. of their weight of this substance, which has come into use already as a solvent of resins, and even of caoutchouc; and it is warmly recommended for the manufacture of varnish. It is also valuable as a febrifuge; and on this account, in Spain and the south of France, it has been made to replace quinine with decided advantage.

CHANGES IN THE PROXIMATE PRINCIPLES OF HERBACEOUS VEGETABLES.—Deherain maintains that the proximate principles of vegetables migrate from the older to the newly formed leaves, and that this migration is associated with a transformation of glucose into cane-sugar, while, when the seed is formed, the cane-sugar is converted into starch and the albumen into gluten, both insoluble. In this way the conversion of soluble into insoluble principles and the accumulation of substances in the seed is accounted for, and is illustrated by the following experiment: If a porous vessel, containing distilled water, be placed in another vessel containing a solution of cupric sulphate, the salt penetrates by diffusion into the inner vessel. If then a few drops of baryta-water be added to the inner vessel, the salt is precipitated, the equilibrium is disturbed, and a new portion of cupric sulphate diffuses into the inner vessel. The salt may be again precipitated by the baryta-water, and the operations repeated till eventually the whole of the cupric sulphate will have passed into the porous vessel, and there become precipitated.

POWER OF SOILS IN ABSORBING GASES.—Prof. Reichardt, of Jena, has instituted a series of experiments, with the aid of Herr Scheermesser, upon the capacity of the constituents of the earth to absorb gases, and has been led to the following conclusions: 1. The power of absorbing carbonic acid gas exhibited by clay purified with hydrochloric acid,

as well as that dried at a temperature of 212° Fahrenheit, or even brought to a red heat, and also that of purified kaolin, is very slight, compared with that which contains hydrated oxide of iron. 2. Sand, purified with hydrochloric acid, and brought to a red heat, absorbs very slowly traces only of carbonic acid. 3. Mixtures of clay and sand, in a dry condition, absorb traces only of carbonic acid; but notably larger quantities in a moist condition. Exposed to the rays of the sun when moist, they lose the carbonic acid absorbed, but in the shade again take it up gradually. The absorption of carbonic acid by the pure mixture is, nevertheless, quite inconsiderable compared with that containing hydrated oxide of iron. 4. The percentage of carbonic acid in hydrated oxide of iron is constantly very considerable, even if variable; the difference depending upon the density of the deposit, the temperature at which this is dried, and upon its degree of moisture. 5. The amount of carbonic acid in the soils increases in proportion to their percentage of hydrated oxide of iron. 6. The action of the sun's heat upon dry mixtures of earth is to drive out a large part of all the carbonic acid absorbed. 7. Moist mixtures of earth lose all their carbonic acid under the action of the sun's rays much easier than dry. 8. The relation of oxygen to the nitrogen is altered by moisture in favor of the latter. 9. By heating to 212° Fahrenheit nearly all the carbonic acid is driven out from mixtures of earth. 10. According to all the experiments, mixtures of earths give off carbonic acid under the influence of an elevated diurnal temperature, but the supply is again renewed during the night; the percentage also is always greater in the morning than toward evening. 11. Direct experiments upon the action of hydrated oxide of iron and water upon carbonate of lime prove in the most striking manner the solvent action under its influence in giving off carbonic acid.

ENZOOTIC MISCARRIAGE IN CATTLE.—M. Bouley, well known for his researches into the subject of the diseases of cattle, such as carbuncle, &c., has lately made a communication to the Academy of Sciences of Paris, based upon some investigations of M. Zundel upon epidemic, or what he calls enzootic, miscarriage in cattle. He states that it has long been known that when a cow undergoes a miscarriage in a stable occupied by other cows in a condition of gestation, this accident does not remain isolated, but, on the contrary, and in fact very commonly, the remaining animals miscarry successively, as though a contagious principle had been disengaged from the first case and communicated to all the others. It has already been shown by experiment that if the liquids discharged by a cow that has just miscarried be introduced into the vagina of another cow nearly at full term, the miscarriage will take place in the second case.

According to Franck, this is produced by the micrococci or bacterias, which exist in an extraordinary quantity upon the fœtal envelopes, and conduce to their decomposition. These being introduced into the vagina multiply with great rapidity, penetrate to the uterus, and there initiate that decomposition of which abortion is the consequence.

M. Roloff, on his part, has stated his belief that this enzootic miscarriage results from the introduction into the vagina of substances which have been tainted by the vaginal discharges of the cattle in which abortion has already taken place, and which are taken up in the liquids of the stable, and in the littering, these exhibiting their action upon the vaginal mucous membrane by a reddening and tumefaction which always precede the manifestation of the accident. If these views be in any way correct, it is probable that the remedy for the disease consists in purifying the stable and disinfecting the cattle, which may be done by

vaginal injections of very dilute carbolic acid, or of permanganate of potash, so as to destroy any infection germs that may have penetrated therein.

HATCHING SILK-WORM EGGS AT WILL.—M. Duclaux has presented to the Academy of Sciences of Paris an article upon the method of producing at will the hatching of the eggs of the silk-worm, in which he remarks that shortly after their discharge, and as soon as a change of color takes place, the egg enters upon a kind of rest, or sleep, which usually lasts until winter, and from which it can only emerge under the action of cold, in consequence of which the evolution of the embryo—stationary until that time—has a beginning. The impulse once given, this evolution must go on, and sometimes is interfered with very materially by continued cold, so as to cause the death of the eggs, or else results in a feeble progeny, that becomes involved in disease. The duration of this second period in the history of the egg, occupying from 3 to 3½ months, cannot be materially modified when once begun without danger, but the first, lasting 5 or 6 months, is more manageable, and the period can be reduced to 20 days, or extended to 18 months, at will. To prevent an egg from developing at the ordinary period, it is necessary to keep it, from the moment of laying, at a temperature between 59° and 68° Fahrenheit, and to expose it to cold during a period of 15 days, at least three months before the appointed time for hatching. On the other hand, to cause the egg to hatch before the ordinary time, it is necessary to expose it to cold 20 days after laying, and to leave it at that temperature for two months, and then to remove it. Six weeks after it will be found to be in the same condition as the normal eggs, and may be treated in the same manner. In this way it is possible to have the eggs ready to hatch out at any time of the year.

FACTS FROM VARIOUS SOURCES.

HOMESTEADS IN FLORIDA.—Governor Harrison Reed, in his message to the legislature, recommends "that homesteads be granted to actual settlers upon the State lands upon the same terms as now allowed by the United States Government." He also speaks of the sources of wealth, as follows: "Fish, oysters, and turtle for eleven hundred miles of sea-coast, abound, almost beyond parallel, with bays and inlets, and inland navigable waters, of an equal extent, offer the richest inducements to enterprise and capital, if properly protected by law. Let these mines of wealth be divided into convenient districts, and rented to individuals or companies for stated periods, with protection sufficient to induce the systematic working of them, and a revenue may be derived sufficient, in a few years, to pay the entire expenses of the State government. With the facilities of transportation now enjoyed, St. Andrews' Bay, Apalachicola, Cedar Keys, and Tampa Bay oysters may soon be as celebrated in the markets of Savannah, Charleston, Saint Louis, and the cities of the interior, as the "Saddle Rocks" are in New York, and instead of receiving canned oysters, sardines, and salt fish from the North, we may successfully compete in their markets with the products of any portion of the world."

TEA IN GEORGIA.—William Jones, one of the editors of the Southern Cultivator, Athens, Georgia, has been experimenting with the tea-plant. In 1860 he received from the agricultural department of the Patent

Office, fifty plants. Keeping them in pots until February, 1861, when they were planted out five feet each way, in a loose sandy soil, they grew finely, and in April, 1862, a small quantity of tea was made. Since then, the fifty plants have increased, until he has fifteen thousand, raised from seed. They stood uninjured the severe cold of December, 1870. They do not grow as rapidly in the rolling clay soil as in the sandy land near the coast. The tea made in Georgia took premiums in 1871 at the State Fair, and the fairs at Augusta and Atlanta, and an honorable notice at Savannah.

BEET-SUGAR.—The estimates of the beet-sugar product of Europe for the present manufacturing season somewhat exceed 1,000,000 tons, a small increase upon the product of last year. France will make about 350,000 tons. The business is yearly extending.

ALMONDS IN TEXAS.—A correspondent in Williamson County has four almond trees one year old, which look very well, and seem to be as hardy as the fig. He thinks they can be grown in that State.

IRRIGATION.—A correspondent in El Paso County, Colorado, suggest, in view of the fact that the water in the valley through which the Fontaine-que-Bouille flows is inadequate to the amount of irrigation required, or to the lands susceptible of being brought into cultivation that there are large natural reservoirs near the creek in many places, which could be filled, and thus economize the water. He asks Congress to grant these basins to any parties who will go to the expense of filling them with water for the purposes of irrigation.

THE AGRICULTURAL SOCIETY of Linn County, Oregon was organized in 1859, and in 1865 it became a joint stock association. The fair-grounds consists of 150 acres, with improvements worth $6,000. The gross receipts for 1870, $2,300; for 1871, $4,000. Premiums paid in 1871, $2,675.

MILTON AGRICULTURAL AND HORTICULTURAL SOCIETY of Ohio has lately been organized at Milton, Mahoning County, Ohio. The members withdrew from the Mahoning County Agricultural Society on account of its horse-racing and gambling, which absorbed most of the time and attention of the people, leading them to lose sight of the true claims of agriculture and horticulture. Five acres of the best land belong to the society, and active efforts are being made to render it an effective agent for doing good in the cause of agriculture.

STEAM-PLOWING.—The employment of steam in farm cultivation is extending gradually, if not rapidly, in England, At a recent meeting of the Coggeshall Agricultural Society, the case of a gentleman in Berkshire was mentioned, who uses four steam-engines of 30 horse-power, and in 1870 succeeded in stirring the soil to a depth of 30 inches, and last year went to the depth of three feet. He grew 1,600 acres of beet-root last season for the manufacture of brandy. Another suggestive example was reported at the same meeting. Three years ago the Duke of Northumberland made an arrangement with his tenants, by which he furnished a 12 horse-power engine, those using it being charged their pro rata share for the original outlay, for the wear and tear, with a slight reserve for a new one. The first year the land was plowed at 10 shillings per acre, and deeply cultivated at 5 shillings per acre. If cultivated the second time, the charge was, for plowing, 2s. 6d. per acre, and harrowing, 1s. 6d., not mere harrowing of three-inch teeth, but with machines cultivating 12 to 15 inches. As priority in the use of the plow was important, it was decided that the man whose 30-acre field was first ready should have it, and so on, and when it became an even question, lots were drawn. The result, after three years' trial, has been extremely

satisfactory, largely increasing the profits of the farmer, with a beneficial effect upon the country at large.

WARREN COUNTY, KY.—The surplus productions of this county, shipped on the Louisville and Nashville Railroad, for the year ending June 30, 1871, were: 63,645 bushels wheat, value, $77,556; 3,217 bushels corn, $1,609; 1,011 bushels other grains, $505; 2,766 hogsheads tobacco, $331,920; 1,519 barrels flour, $12,160; 221 barrels potatoes, $552; 45 barrels pork and lard, $1,350; 136 barrels liquor, $12,240; 520 horses and mules, $77,000; 3,180 cattle, $95,400; 24,000 hogs, $384,000; 164 car-loads of coal, $6,150; 195 car-loads of lumber, $32,760; 20 car-loads of brick, $720; 5 car-loads of rock, $250; 2,360,663 pounds general merchandise, $230,066; 78,323 pounds fruit, $3,916; 1,800 sheep, $5,400; 67 casks of bacon, $5,360. Total value shipped as freight, $1,280,854. By express: 214,553 dozen eggs, $42,910; 140,500 pounds butter, $28,100; 175,500 pounds fowls, $22,815; 40,000 pounds wool, $16,000; 20,000 pounds feathers, $10,000; 2,000 dozen brooms, $5,000; 24,728 pounds peltries, $2,472. Total by express, $127,297. The grand total was $1,408,151; and as there is but little not the produce of the soil, the record is worthy of consideration. There was but little corn shipped, that going mostly into pork.

TREE CULTURE.—A farmer in Osage County, Kansas, has planted within the past five years several thousand forest trees, such as oak, walnut, soft maple, elm, white ash, sycamore, catalpa, white and yellow willow, mulberry, and cottonwood. Many of the cottonwoods are now nearly 30 feet high and six inches in diameter.

SILK COCOONS.—The total product of silk cocoons in the United States, as reported in the census of 1870, is 3,945 pounds, of which California produced 3,587; Pennsylvania, 1; Virginia, 15; North Carolina, 95; Georgia, 14; Mississippi, 31; Louisiana, 1; Tennessee, 153; Kentucky, 45; and Missouri, 3.

WHEAT CROP IN ENGLAND.—Mr. J. B. Lawes has published an estimate of the wheat crop of Great Britain for 1871, in which he predicts that the supply will show a great deficiency. He bases his estimate on the fact that the census returns of 1871 show that the average number to be fed in the British Islands, during the ensuing twelve months, is 31,843,970; and assuming the average consumption of wheat to be 5½ bushels per head, the quantity required will be little short of 22,000,000 quarters. Taking the home produce at 24 bushels per acre, (of 61 pounds per bushel,) and the area under wheat to be the same as returned for 1870, viz: 3,773,663 acres, the gross produce of the United Kingdom will amount to about 14,666,667 quarters. Deducting from this 2¼ bushels per acre for seed, there is left for consumption as food about 10,250,000 quarters, leaving a requirement of 11,500,000 quarters to be supplied from foreign sources. Other writers estimate the deficiency at 13,000,000 quarters, that will be required from other countries, besides enormous quantities of other grain, meat, butter, cheese, eggs, &c. There are, besides, several circumstances pointing to a large consumption of bread during the coming harvest year. Meat is exceedingly dear in England; labor is in great demand, and full wages are paid. The potato disease has appeared, with a virulence unequaled since 1846, in various districts, and although the extent of its ravages cannot yet be stated, it is certain that this crop will prove lamentably short. The information at present at command leaves no reason to fear that there will be any deficiency of foreign corn to meet the above want, though prices have advanced in Hungary and Russia, notwithstanding the accumulations of old wheat. The imports of wheat into England for the first nine months

of 1871 exceed those of the corresponding period of the preceding year by nearly $20,000,000; about one-third of the imports were from the United States.

CHEESE FACTORIES.—The American cheese-factory system is affecting the markets of England to such a degree that, at the late discussions of the Ayrshire Farmers' Club it was stated that this system must be introduced there generally, or they must give up dairying, on the old system, altogether. In the rich grazing district of Cheshire, where 11,000 tons of the best cheese in England is made, the American factory system is being introduced with great favor; and in other districts it is proposed to send deputations to this country to fully investigate the workings of our cheese factories. At a large sale of cheese in Liverpool, the product of the Derbyshire cheese factory sold higher than the produce of the Cheshire dairies generally. Many dairymen have expressed their decided conviction that under the factory system they could manufacture cheaper, and produce a superior article, with a great relief to farmers' wives. While Cheshire cheese has not advanced in price from what it was fifty years ago, butter, for several years, has been sold, steadily, sixty per cent. higher.

CONDENSED MILK is becoming a large and new trade, and will ultimately contribute largely to the food of the world. Milk is wanted not only at sea, but in the rapid growth of many large cities, pure milk, as an article essential to children, becomes less and less abundant. Condensed-milk factories have been established in various places in Great Britain, in the Argentine Republic, and even in Australia, whence condensed milk has become an article of export to Europe.

PHYSICAL DEGENERACY OF CITY POPULATION.—At the last meeting of the British Social Science Association it was stated as an unquestionable fact that, with the increase of factory and in-door work, the physical type in Englishmen has degenerated of late years. Broad chests and powerful limbs are no longer the rule among laborers and artisans, and the recruiting sergeant complains that the doctor rejects every year a large proportion of the men recruited by him, and even those admitted to the ranks are very inferior in bone and muscle to their older comrades. Of those enlisted in the last few years, 38 per cent. have been rejected; in some districts four out of five are rejected on the ground of physical disqualification. This is ascribed to the concentration of the working classes in cities, to the depressing circumstances of their city life, and to the large proportion of those engaged in in-door employments. So many females also are withdrawn from rural to factory life, that gross ignorance as to the use and preparation of food, and of domestic economy and cooking, abounds among the poor, rendering their condition deplorable.

IRRIGATION.—It is suggested in England that Parliament, by special act, authorize two or more landholders to join together for united action in the construction and development of irrigation works, and that loans at low interest be granted by government upon the security of the property thus improved. So important is this subject considered by the Spanish government that irrigation works are authorized by the "Ley del Agua," by an enactment most judicious and comprehensive.

ADULTERATION OF TEA.—So extensively is this now carried on in China, that Mr. Medhurst, the British consul at Shanghai, states that when he wrote 53,000 pounds of willow-leaves were in course of manipulation at one port alone, to be mixed with tea for shipment at the ratio of from 10 to 20 per cent. The trade in these willow-leaves (which

cost about four cents a pound) is openly carried on, and not the slightest attempt is made to disguise the object for which they are prepared.

DISEASES OF CATTLE.—The London Veterinarian says the present condition of Europe with regard to the cattle plague is not very reassuring. It still threatens Germany, and has not been exterminated either in Galicia or Lower Austria. It has broken out in Poland, on the direct line of railway leading into Silesia; also in the Baltic province of Livonia in Russia, near the port of Riga, and among the cows in the dairies of St. Petersburg, besides existing to an alarming extent in Southern Russia, where sheep as well as cattle are attacked. It has also appeared in several departments in France, extending its ravages from the neighborhood of Paris toward the channel coast at Havre and Dieppe. In Holland, however, the pleuro-pneumonia has been steadily declining for several months.

The foot and mouth disease still retains a strong hold in many parts of Great Britain, and is reported as existing in eighty-two counties. Fairs and markets in connection with the Irish cattle-trade have proved prolific sources of mischief. It exists in Holland; and a cargo of twelve hundred sheep, landed at Harwich from Rotterdam, four of them being found infected with the disease, the whole were immediately slaughtered at the place of landing. Other cargoes from the same port, in which the disease was detected, were summarily dealt with in the same manner.

The small-pox in sheep has increased to rather a serious extent in Pomerania and other parts of the North German States. Inoculation continues to be carried out on a large scale, farmers having the fullest confidence in its protection against the natural disease, as well as that the benign nature of the inoculated sheep-pox rarely leads to fatal results. English farmers generally concur in this opinion.

The influenza in horses, which was noticed and excited alarm in the stables of New York, a few months since, is going the rounds of the large towns and cities of Europe; in some places in England it has made great havoc. The pathology of this disease requires a more full investigation than it has yet received.

CARBOLIC AID IN VETERINARY PRACTICE.—La Tribune Médicale of Savoy states that a destructive epidemic of cattle plague was arrested by the following treatment: 1. Bleed to the extent of three quarts. 2. Administer a quart of lukewarm water, in which are dissolved two and a half drachms of crystalized carbolic acid. 3. Give, once or twice, four quarts of strong infusion of coffee. 4. Energetic frictions to excite cutaneous reaction. 5. Scarify the infiltrated regions. 6. In the course of the complaint give several quarts of the infusion of gentian. 7. Dress with a solution of the above-mentioned carbolic acid, above the pustules which form on the hide. In this manner fifty cows, seven horses, and one pig were treated, of which only one cow died, and the epidemic was arrested.

WILD BEASTS AND SNAKES IN INDIA.—The Viceroy of India has continued and extended the liberal rewards for the destruction of wild beasts and snakes. The following record of dreadful deaths from both causes, during three years, is condensed from the Government Gazette. Killed by wild beasts, by the returns from only ten districts, 12,554; killed by snakes, in nine districts, 25,664; total from both causes, 38,218, and these are only the cases officially reported. How many thousands of other deaths, from the same horrible causes, in districts not reported, and in lonely, isolated villages, dreary swamps, and wild jungles, from which official reports cannot be obtained, will never be known. The

sanguinary horrors of Waterloo, Trafalgar, and any year of Napoleon's battles, hardly equal this.

FORESTRY; FORETHOUGHT.—In England there are about 40,000 acres of young oaks and other growing timber, planted in inclosures by authority of acts of Parliament, of which 10,000 were planted last year. Of the trees thus planted for navy purposes, none of them have attained much more than half of their full one hundred years' growth; the thinnings, necessary to make room for the ultimate crop to reach maturity, produce a large income.

MARKET PRICES OF FARM PRODUCTS.

Articles.	January.	Articles.	January.
NEW YORK.		**BOSTON—Continued.**	
Flour, superfine State..per bbl.	$5 70 to $6 10	Cheese, N. Y. and Vt. choice	
extras.....do....	6 40 to 7 10	factory.....per lb..	$0 13½ to $0 14½
superfine western .do....	5 70 to 6 10	Ohio choice factory..do.	12½ to 13½
extra to choice ....do....	6 35 to 9 35	Hay.....per ton....	30 00 to 36 00
extra southern.... do....	6 60 to 7 35	Tobacco, choice.....per lb....	12 to 14
good to choice .....do....	7 40 to 9 25	good western ...do....	11 to —
Wheat, No. 1 spring..per bush..	— — to — —	common & medium.do.	10 to 11
No. 2 spring .....do....	1 52 to 1 55	Wool, Ohio and Penn ..per lb..	62 to 75
winter, red western do..	1 57 to 1 60	Michigan .....do....	60 to 70
amber, western...do....	1 62 to 1 65	others, western ....do....	60 to 66
white, western ...do....	1 63 to 1 74	California.....do....	35 to 55
Rye .....do....	90 to 92	Texas.....do....	30 to 47½
Barley.....do....	90 to 1 00	combing fleece .....do....	70 to 74
Oats, ...do....	54 to 57		
Corn, new western, mixed..do....	77 to 79	**PHILADELPHIA.**	
old western, mixed. .do....	79½ to 80		
Hay, shipping qualities..per ton..	27 00 to 28 00	Flour, superfine .....per bbl..	5 25 to 5 75
prime .....do....	29 00 to 34 00	extras .....do....	6 00 to 6 37½
Pork, mess .....per bbl..	13 00 to 14 50	family & fancy brands..do.	7 25 to 9 50
prime .....do....	12 25 to — —	Wheat, red, Pennsylvania and	
Beef, plain mess .....do....	9 00 to 11 00	western.....per bush.	1 57 to 1 60
extra.....do....	11 00 to 13 00	amber .....do....	1 65 to 1 67
Lard, ...per lb..	9 to 9½	Rye.....do....	88 to 90
Butter, western .....do....	12 to 23	Corn, yellow.....do....	69 to 76
State dairy .....do....	21 to 35	mixed western.....do....	71 to 73
Cheese, western dairy ....do....	11 to 13	Oats, western white .....do....	54 to 54½
State factory .....do....	12 to 14	Pork, mess .....per bbl..	14 50 to 15 50
Cotton, ordinary to good ordi-		Beef, mess, city packed..do....	15 00 to 15 50
nary .....per lb....	17⅝ to 19⅞	Lard.....per lb..	9½ to 10
low middling to good			
middling....per lb....	20 to 22⅜	**BALTIMORE.**	
Tobacco, lugs, all grades..per lb..	— — to — —		
common leaf ....do....	— — to — —	Flour, superfine .....per bbl.	6 00 to 6 75
Wool, pulled .....do....	48 to 70	extras .....do....	6 50 to 10 00
tub-washed .....do....	68 to 85	family .....do....	7 50 to 10 50
California spring clip..do.	36 to 47	Wheat, Pennsylvania..per bush	1 56 to 1 63
fall .....do....	35 to 42	western .....do....	1 50 to 1 60
Texas, inferior to fine..do.	38 to 48	Maryland .....do....	1 57 to 1 70
		Rye .....do....	92 to 1 00
BOSTON.		Corn, yellow.....do....	67 to 70
		white .....do....	68 to 71
Flour, western, superfine..per bbl.	5 25 to 5 75	Oats.....do....	53 to 58
extras.....do....	6 25 to 7 50	Hay, western.....per ton..	32 00 to 34 00
choice.....do....	7 75 to 10 00	Penn. and Maryland..do....	33 00 to 38 00
southern extras ....do....	6 50 to 7 25	Pork, mess.....per bbl..	15 00 to — —
choice Baltimore ...do....	9 00 to 10 25	Butter, western, prime to	
Wheat.....per bush..	1 60 to 1 65	choice.....per lb..	24 to 26
Rye .....do....	95 to —	New York.....do....	25 to 33
Barley.....do....	75 to 1 10	Cheese, western factory ..do....	14 to 14½
Corn, southern yellow,....do....	80 to 81	eastern.....do....	14 to 15
western mixed.....do....	77 to 79	Lard.....do....	9½ to 10¼
western yellow ....do....	79 to 81	Cotton, ordinary.....do....	17½ to 18½
Beef, mess.....per bbl..	10 00 to 12 00	middling .....do....	20 to 20⅝
extra .....do....	12 00 to 13 00	Tobacco, common to good lugs.	7 to 8½
Pork, prime ....do....	11 50 to 12 50	common to medium	
mess .....do....	15 00 to 15 50	leaf .....per lb..	8 to 10½
Lard .....per lb..	9½ to 11½	Wool, unwashed, free from	
Butter, N. Y. and Vt .....do....	18 to 33	burrs.....per lb..	40 to 43
Canada .....do....	20 to 30	tub-washed.....do....	58 to 63
western.....do....	12 to 28		

Market prices of farm products.—Continued.

Articles.	January.		
CINCINNATI.			
Flour, superfine.....per bbl..	$5 75	to	$6 00
extra.....do....	6 50	to	6 65
family.....do....	6 65	to	6 85
Wheat, No. 1 white...per bush..	1 55	to	1 60
No. 2 white.....do....	1 50	to	— —
No. 1 red.....do....	1 42	to	— —
No. 2 red.....do....	1 40	to	— —
Corn, white.....do....	48	to	50
yellow.....do....	48	to	—
Oats, white.....do....	40	to	—
No. 1 mixed.....do....	38	to	—
Rye.....do....	81	to	82
Barley, winter, No. 2.....do....	75	to	85
Spring, No. 2.....do....	75	to	80
Hay, tight-pressed, common to choice.....per ton..	14 00	to	19 00
loose-pressed, prime to choice.....per ton..	17 00	to	21 00
Pork, mess.....per bbl..	13 50	to	— —
prime.....do....	— —	to	— —
Beef, plate.....per bbl..	13 00	to	13 50
Hams.....do....	26 00	to	28 00
Lard, prime steam.....per lb..	8⅝	to	8¾
Butter, western reserve...do....	23	to	25
choice cent'l Ohio.do....	18	to	22
Cheese, western reserve..do....	—	to	—
choice factory.....do....	14½	to	15
Tobacco, lugs, West Va...do....	5	to	9
lugs, Kentucky..do....	9¼	to	13
medium leaf, West Virginia.....per lb..	8	to	15
medium leaf, Ky..do....	13	to	16
Wool, tub-washed.....do....	65	to	70
fleece-washed, manufacturing.....per lb..	50	to	55
fleece-washed, combing, ...per lb..	52	to	55
unwashed, manuf'g.do....	42	to	45
unwashed, comb'g.do....	42	to	45
pulled.....do....	52	to	56
CHICAGO.			
Flour, winter extras...per bbl..	7 60	to	8 25
spring extras.....do....	— —	to	— —
Wheat, No. 1 spring..per bush..	1 23½	to	— —
No. 2 spring.....do....	1 20½	to	1 21½
No. 3 spring.....do....	1 10⅝	to	— —
Corn, No. 2.....do....	40¼	to	40⅝
rejected.....do....	38	to	—
Oats, No 2.....do....	31⅜	to	32⅛
rejected.....do....	28	to	—
Rye, No. 2.....do....	63½	to	63½
Barley, No. 2.....do....	60½	to	61
Hay, timothy (on track) .per ton.	12 00	to	15 00
prairie.....do....	9 00	to	13 00
Pork, mess.....per bbl..	13 00	to	13 10
extra.....do....	— —	to	— —
Beef, mess.....per bbl.	8 00	to	8 25
Lard.....per lb..	8½	to	8⅝
Butter, choice dairy.....do....	20	to	25
fair to good tub and firkin.....per lb..	14	to	17
Cheese, New York factory..do....	15½	to	16
western, factory...do....	13	to	15
Ohio, factory.....do....	14	to	15
Wool, medium fleece.....do....	58	to	62
unwashed medium..do....	38	to	43
tub-washed.....do....	50	to	75
ST. LOUIS.			
Flour, superfine.....per bbl..	5 25	to	— —
extras.....do....	5 75	to	6 85
choice.....do....	7 35	to	8 50

Articles.	January.		
ST. LOUIS—Continued.			
Wheat, red.....per bush..	$1 40	to	$1 70
white.....do....	1 60	to	1 75
spring.....do....	1 28	to	— —
Corn, mixed.....do....	43	to	48
yellow.....do....	46	to	—
white.....do....	48	to	—
Oats, white.....do....	35½	to	44¼
mixed.....do....	37	to	41
Rye.....do....	73	to	75
Barley, winter.....do....	80	to	82½
spring.....do....	62½	to	75
Hay.....per ton..	16 00	to	25 00
Pork, mess.....per bbl..	13 25	to	— —
Lard, prime steam.....per lb..	8¼	to	8⅜
kettle.....do....	8⅜	to	—
Butter, choice.....do....	23	to	33
medium to fair....do....	17	to	20
Cheese, choice factory....do....	14½	to	15
Cotton, middling.....do....	18⅜	to	19
Tobacco, lugs.....do....	6¾	to	8
common leaf....do....	8	to	8¾
medium to good leaf, per lb.....	9	to	12
Wool, tub-washed.....per lb..	59	to	70
fleece-washed.....do....	48	to	56
unwashed medium..do....	40	to	42
NEW ORLEANS.			
Flour, superfine.....per bbl..	7 12	to	7 25
extras, (according to grade).....per bbl..	7 37½	to	9 75
Corn, white.....per bush..	74	to	78
yellow.....do....	74	to	78
mixed.....do....	74	to	75
Oats.....do....	60	to	—
Hay, choice.....per ton..	34 00	to	— —
prime.....do....	30 00	to	— —
Pork, mess.....per bbl..	14 50	to	15 00
Beef, mess, (Texas).....do....	10 00	to	16 00
Lard, tierce.....per lb..	9¼	to	9⅜
keg.....do....	10¼	to	10½
Butter, choice western....do....	25	to	28
Goshen.....do....	33	to	35
Cheese, choice factory....do....	16	to	17
western reserve..do....	13	to	14
New York cream.do....	16	to	17
Cotton, ordinary to good ordinary.....per lb..	18⅜	to	18⅝
middling to good middling.....per lb..	18⅞	to	20
Tobacco, lugs.....do....	7	to	8
low leaf.....do....	8	to	8½
medium leaf....do....	9	to	9½
SAN FRANCISCO.			
Flour, superfine.....per bbl..	6 00	to	— —
extra super.....do....	6 25	to	6 50
higher grades.....do....	7 00	to	7 25
Wheat, State.....per cental..	2 15	to	2 35
Oregon.....do....	2 25	to	2 35
Corn, white.....do....	2 10	to	—
yellow.....do....	2 15	to	— —
Hay, State.....per ton..	18 00	to	23 00
Pork, mess.....per bbl..	19 00	to	20 00
prime.....do....	17 50	to	18 50
Beef, mess.....do....	13 00	to	14 00
Lard.....per lb..	11½	to	13
Butter, overland.....do....	20	to	32½
California.....do....	35	to	40
Oregon.....do....	20	to	25
Cheese.....do....	15	to	17
Wool, native.....do....	18	to	20
California.....do....	22½	to	35
Oregon.....do....	30	to	—

The above quotations represent the state of the market as nearly as possible at the opening of the month.

METEOROLOGY.

DECEMBER, 1871.

[COMPILED IN THE DEPARTMENT OF AGRICULTURE FROM REPORTS MADE BY OBSERVERS OF THE SMITHSONIAN INSTITUTION.]

Table showing the highest and lowest range of the thermometer, the mean temperature, and amount of rain and melted snow. Observations daily at 7 a. m. and 2 and 9 p. m.

State and station.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain and melted snow.
MAINE.				*Deg.*		*Deg.*	*Deg.*	*In.*
Surry	Hancock	Oscar H. Tripp	24	47	21	−14	21.9	.....
Bucksport	....do	Willabe Haskell	4	43	21	−10	24.4	.....
Orono	Penobscot	M. C. Fernald	4	44	21	−11	17.0	4.16
Brewer Village	....do	E. D. Mayo	4	43	21	− 5	20.6	.....
Montville	Waldo	A. J. Clifford	24	44	21	−15	17.3	4.67
Do	....do	J. R. Clifford	24	44	21	−12	19.1	3.75
Palermo	....do	B. C. Wentworth	24	43	21	−11	19.1	.....
West Waterville	Kennebec	B. F. Wilbur	24	44	21	−10	19.4	4.52
Gardiner	....do	R. H. Gardiner	4	46	21	−10	20.0	3.23
Lisbon	Androscoggin	Asa P. Moore	24	50	21	−10	20.0	2.45
Standish	Cumberland	J. P. Moulton	4	49	21	−11	22.7	4.18
East Wilton	Franklin	H. Reynolds, M. D.	25	45	21	−13	17.1	3.40
Norway	Oxford	H. D. Smith	25	44	21	−16	18.2	3.30
Cornish	York	Silas West	25	44	21	− 7	19.9	2.87
Cornishville	....do	G. W. Guptill	25	46	21	−12	20.4	4.40
NEW HAMPSHIRE.								
Stratford	Coos	Branch Brown	25	43	21	−22	15.9	3.06
Tamworth	Carroll	Alfred Brewster	25	45	16	−16	19.0	4.32
Contoocookville	Merrimack	E. D. Couch	28	53	21	− 9	23.5	3.00
Amoskeag	Hillsborough	Alfred Colby	4	47	21	−12	22.4	2.99
VERMONT.								
Lunenburgh	Essex	H. A. Cutting	24	45	21	−30	17.3	3.70
Craftsbury	Orleans	Rev. E. P. Wild	25	40	21	−24	13.2	2.98
Randolph	Orange	C. S. Paine	25	46	21	−24	18.9	2.72
Woodstock	Windsor	Doton & Miller	25	41	16	−21	16.5	2.55
Norwich	....do	S. B. Phelps	25	45	21	−16	21.9	3.79
Near St. Albans	Franklin	A. H. I. Gilmour	23	47	21	−23	16.6	2.70
West Charlotte	Chittenden	Miss M. E. Wing	24	46	21	−12	24.4	1.95
Panton	Addison	D. C. and M. E. Barto	4, 24, 25	40	21	−18	19.3	4.12
Castleton	Rutland	Rev. R. G. Williams	23	51	21	−17	20.1	2.74
MASSACHUSETTS.								
Kingston	Plymouth	G. S. Newcomb	25	55	21	− 6	29.5	2.59
Lawrence	Essex	John Fallon	4, 25	48	21	− 6	24.3	2.30
Milton	Norfolk	Rev. A. K. Teele	26	60	21	0	29.5	3.85
New Bedford	Bristol	Samuel Rodman	25, 26	48	21	− 2	28.8	2.31
Do	....do	E. T. Tucker	4	48	21	− 3	28.7	2.94
Do	....do	George S. Hart	25	51	21	− 2	31.7	2.28
Cambridge	Middlesex	Mrs. S. H. Perry	4	52	21	− 6	27.2	.....
North Billerica	....do	Rev. E. & W. W. Nason	25	51	16, 21	− 4	26.5	.....
Mendon	Worcester	J. G. Metcalf, M. D.	23	50	21	− 6	24.4	2.90
Lunenburgh	....do	G. A. Cunningham	25	53	21	− 8	24.1	4.03
Worcester	....do	M. Bemis, M. D.	30	80	21	1	27.1	1.55
Amherst	Hampshire	Prof. E. S. Snell	4	43	21	− 6	24.5	2.07
Hinsdale	Berkshire	Rev. E. Dewhurst	23	42	21	−30	22.0	.....
Williamstown	....do	Prof. A. Hopkins	23	50	21	−11	24.3	2.72

Table showing the highest and lowest range of the thermometer, &c.—Continued.

State and station.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain and melted snow.
RHODE ISLAND.				*Deg.*		*Deg.*	*Deg.*	*In.*
Newport	Newport	W. A. Barber	4	48	21	1	31.3	2.41
CONNECTICUT.								
Columbia	Tolland	W. H. Yeomans	24	52	21	— 6	25.9	2.37
Middletown	Middlesex	John Johnston	25	47	21	— 7	25.2	2.17
Southington	Hartford	L. Andrews	23	50	21	— 5	26.3	2.77
Colebrook	Litchfield	Charlotte Rockwell	25	51	21	—14	21.5	2.75
Round Hill	Fairfield	Rev. W. P. Alcott	23	48	21	— 7	25.2	1.89
NEW YORK.								
Moriches	Suffolk	E. A. Smith & daughter	24	57	21	— 7	32.1	3.00
South Hartford	Washington	G. M. Ingalsbe	25	50	21	—20	22.7	3.72
North Argyle	....do	George M. Hunt	23	47	21	—23	19.2	3.40
Garrison's	Putnam	Thomas B. Arden	23	48	21	— 2	28.0	2.91
White Plains	Westchester	Prof. O. R. Willis	24	49	21	0	29.6	.....
Cooper Union	New York	Prof. O. W. Morris	24	53	21	5	31.5	2.29
Brooklyn	Kings	I. P. Mailler	24	49	21	— 2	30.1	3.15
Flatbush	....do	Rev. E. T. Mack	24	45	21	0	27.8	1.45
Glasco	Ulster	D. B. Hendricks	25	45	21	— 8	21.5	2.45
Minaville	Montgomery	D. S. Bussing	23	46	21	—20	29.0	.....
Middleburgh	Schoharie	Rev. S. W. Roe	23	70	21	— 8	27.3	1.30
Canton	St. Lawrence	Leslie A. Lee	23	50	21	—28	18.6	2.40
Gouverneur	....do	C. H. Russell	14	53	21	—40	18.0	3.19
North Hammond	....do	C. A. Wooster	23	50	21	—27	21.1	2.31
Fairfield Seminary	Herkimer	G. F. Sawyer	23	40	21	—27	18.2	2.18
Cooperstown	Otsego	G. P. Keese	23	45	21	—23	21.6	1.76
Lowville	Lewis	Rev. W. N. Irish	25	42	21	—35	18.0	3.32
South Trenton	Oneida	Storrs Barrows	23	48	21	—24	20.2	2.00
Oneida	Madison	S. Spooner, M. D	23	50	21	—14	27.2	3.79
Cazenovia	....do	Prof. W. Soule	23	49	21	—12	21.8	4.89
Depauville	Jefferson	Henry Haas	23	46	21	—25	19.6	4.28
Oswego	Oswego	W. S. Malcom	31	44	21	— 4	25.4	1.30
Palermo	....do	E. B. Bartlett	23	42	21	—19	21.0	4.20
North Volney	....do	J. M. Patrick	23	48	21	—15	23.2	.....
Waterburgh	Tompkins	D. Trowbridge	25	48	21	—10	23.7	1.10
Nichols	Tioga	Robert Howell	25	52	21	—11	26.0	.....
Newark Valley	....do	Rev. Samuel Johnson	25	50	21	—16	22.8	3.70
Himrod's	Yates	G. D. Baker	23	48	21	—12	23.7	0.94
Rochester	Monroe	G. P. Hachenberg, M. D	31	50	21	5	29.0	2.05
Little Genesee	Allegany	Daniel Edwards	23, 24	44	21	20	32.6	3.02
Angelica	....do	C. P. Arnold	22, 25	50	21	—28	23.4	2.76
Carlton	Orleans	M. P. Godfrey	31	48	20	0	24.9	3.55
Lockport	Niagara	B. W. Clark	23, 31	49	21	— 8	23.4	3.35
Buffalo	Erie	William Ives	23	52	21	—10	25.6	2.04
Jamestown	Chautauqua	S. G. Love	31	46	21	— 7	23.6	5.45
NEW JERSEY.								
Newark	Essex	W. A. Whitehead	25	48	21	— 1	29.0	2.18
South Orange	....do	W. J. Chandler, M. D	25	50	21	— 8	25.8	3.67
Trenton	Mercer	E. R. Rock	24	48	21	— 1	31.5	3.34
Moorestown	Burlington	T. J. Beans	23	57	21	— 1	28.7	2.50
Rio Grande	Cape May	Mrs. J. R. Palmer	25	58	21	1	32.6	1.23
New Germantown	Hunterdon	A. B. Noll	25	49	21	— 6	26.0	2.01
Readington	....do	John Fleming	25	50	21	— 2	28.4	.....
Atco	Camden	H. A. Green	23	59	21	—12	29.9	.....
Vineland	Cumberland	J. Ingram, M. D	23	55	21	— 3	30.8	3.94
Greenwich	....do	Miss R. C. Sheppard	23	52	21	1	32.2	2.12
Alloway stown	Salem	H. C. Perry	23	53	21	— 6	29.8	2.35
PENNSYLVANIA.								
Nyces	Pike	J. Grathwohl	25	57	21	—11	24.8	2.16
Dyberry	Wayne	Theodore Day	25	47	21	—13	22.5	1.41
Fallsington	Bucks	Ebenezer Hance	23	54	21	0	29.6	2.40
Germantown	Philadelphia	Thomas Meehan	24	50	21	— 3	29.3	.....
Philadelphia	....do	Prof. J. A. Kirkpatrick	24	47	21	6	33.0	1.87
Horsham	Montgomery	Miss Anna Spencer	8, 24	45	21	— 2	28.1	0.70
Plymouth Meeting	....do	M. H. Corson	24	45	21	0	28.3	0.90
Egypt	Lehigh	Edward Kohler	25	51	21	— 5	27.1	.....
West Chester	Chester	George Martin, M. D	8	45	21	— 5	27.0	1.93

Table showing the highest and lowest range of the thermometer, &c.—Continued.

State and station.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain and melted snow.
PENN.—Cont'd.				Deg.		Deg.	Deg.	In.
Parkersville	Chester	F. Darlington, M. D	11, 25	45	21	— 1	28.2	1.85
Factoryville	Luzerne	Rodman Sisson	23	48	21	— 9	25.3	1.27
Reading	Berks	J. H. Raser	25	53	21	3	32.0	1.15
Ephratah	Lancaster	W. H. Spera	25	52	21	— 6	28.2	2.19
Do	do	W. F. Madlem	25	47	21	— 2	29.6	.....
Mount Joy	do	J. R. Hoffer, M. D	24	55	21	4	31.8	.....
Tioga	Tioga	E. T. Bentley	25	46	21	—22	25.3	1.30
Lewisburgh	Union	Prof. C. S. James	25	45	21	— 6	26.3	1.43
Carlisle	Cumberland	W. H. Cook, M. D	2, 12	47	21	1	28.2	1.40
Mt. Rock	do	Jacob Lefever	25	46	21	— 3	26.4	1.02
Fountain Dale	Adams	S. C Walker	25	53	21	— 3	29.3	1.21
York S. Springs	do	J. H. Marsden, M. D	25	52	21	— 3	31.1	0.80
Grampian Hills	Clearfield	Elisha Fenton	23, 25	49	21	—18	20.9	2.00
Greensburgh	Westmoreland	J. M. L. Stump	25	68	21	—14	30.0	1.83
Franklin	Venango	Rev. M. A. Tolman	31	48	21	—10	24.5	2.86
Connellsville	Fayette	John Taylor	31	68	21	—14	29.4	.....
Tarentum	Allegheny	J. Cummings	23, 25	56	21	—10	.....	.....
Pittsburgh	do	George Albree	31	58	21	— 2	31.0	.....
Allegheny	do	B. Fcicht, M. D	31	65	21	— 4	30.9	1.20
Greenville	Mercer	D. B. Packard	31	51	21	—11	24.5	3.15
Newcastle	Lawrence	E. M. McConnell	23	62	21	—10	26.3	1.49
Beaver	Beaver	Rev. R. T. Taylor	23	62	21	— 4	29.7	.....
Cannonsburgh	Washington	William Smith, D.D	25	60	21	—19	28.6	1.60
DELAWARE.								
Milford	Kent	R. H. Gilman	23	62	21	— 4	32.8	2.30
Dover	do	J. H. Bateman	23	60	21	0	32.3	2.30
MARYLAND.								
Woodlawn	Cecil	J. O. McCormick	24	52	21	— 4	28.6	1.56
Fallston	Harford	G. G. Curtis	24	50	21	— 4	29.4	1.62
Woodstock College	Baltimore	Rev. A. X. Valente	8	48	21	— 5	28.1	1.51
Annapolis	Anne Arundel	W. R. Goodman	8	56	21	0	35.9	2.46
St. Inigoes	St. Mary's	J. F. Elliott	25	62	21	6	36.2	2.40
Sam's Creek	Carroll	F. J. Devilbiss	25	62	21	— 2	31.3	1.50
Mt. St. Mary's	Frederick	Prof. C. H. Jourdan	25	50	21	— 1	29.6	1.01
Frederick	do	J. K. Hanshew	26	54	21	3	32.5	0.96
Cumberland	Alleghany	E. T. Shriver	25	55	21	— 1	30.3	.....
DIST. COLUMBIA.								
Washington	Washington	.....	8	54	21	5	35.0	1.58
VIRGINIA.								
Johnsontown	Northampton	C. R. Moore	25	66	21	9	38.7	2.20
Capeville	do	Emma C. Townsend	25	68	21	12	41.5	.....
Hampton	Elizab'th City	J. M. Sherman	25	72	21	9	40.2	2.05
Surry C. H	Surry	B. W. Jones	26, 31	74	21	5	40.8	2.50
Comorn	King George	E. T. Tayloe	25	64	21	1	34.2	.....
Vienna	Fairfax	H. C. Williams	24	62	21	— 2	33.9	2.20
Do	do	G. A. Bowman	6, 10	54	16	18	32.8	.....
Accotink	do	C. Gillingham	24	56	21	— 1	31.5	1.53
Near Vienna	do	R. Robey	25	76	21	— 6	31.2	0.69
Piedmont	Fauquier	F. Williams	18	60	21	— 4	30.9	2.00
Piedmont Station	do	W. A. Martin	25	59	21	— 3	31.6	0.35
Keswick Station	Albemarle	Capt. D. B. Horn	18, 25	62	21	1	34.1	.....
Mt. Solon	Augusta	J. T. Clark, M. D	31	64	21	— 2	32.8	0.50
Lynchburgh	Bedford	C. J. Meriwether	25, 26	60	21	9	38.2	1.30
Wytheville	Wythe	Rev. J. A. Brown	31	68	21	— 3	34.2	0.60
WEST VIRGINIA.								
Weston	Lewis	Benjamin Owens	23, 25	62	21	—11	32.3	.....
Cabell C. H	Cabell	C. L. Roffe	25	62	21	0	34.2	.....
NORTH CAROLINA.								
Tarborough	Edgecombe	R. H. Austin	25, 27	70	31	6	39.5	1.50
Oxford	Granville	W. R. Hicks, M. D	18	62	21	9	38.4	1.50

Table showing the highest and lowest range of the thermometer, &c.—Continued.

State and station.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain and melted snow.
N. C.—Continued.				*Deg.*		*Deg.*	*Deg.*	*In.*
Fayetteville	Cumberland	G. W. Lawrence	26	74	21	16	44.0	1.90
Albemarle	Stanley	F. J. Kron	26	74	6, 9	5	39.0	1.17
Statesville	Iredell	T. A. Alison	25, 26, 31	60	21	5	35.2	1.25
Asheville	Buncombe	E. J. Aston	25	65	21	4	37.1	------
Do	....do	J. T. E. Hardy, M. D.	25, 30	70	21	2	38.1	------
SOUTH CAROLINA.								
Gowdeysville	Union	Charles Petty	26	70	6	12	44.0	2.17
Greenville C. H.	Greenville	L. Gibbon	18, 19	70	21	16	42.7	3.40
GEORGIA.								
Berne	Camden	H. L. Hillyer	23	74	6	25	49.1	1.55
St. Mary's	....do	Ebenezer Barker	24, 26	76	6	29	52.9	2.65
Trader's Hill	Charlton	Dr. F. M. Smith	24, 27	78	6	26	53.5	------
Quitman	Brooks	J. L. Cutler	31	77	6	27	53.5	3.10
Macon	Bibb	S. P. Sanford	26	74	21	19	47.8	6.30
Atlanta	Fulton	Charles Deckner	31	72	5, 21	14	44.0	0.77
La Fayette	Walker	A. R. McCutchen	25	70	5, 6, 21	12	40.6	2.49
ALABAMA.								
Moulton	Lawrence	T. M. Peters	29	69	5	16	44.0	1.50
Selma	Dallas	Dr. Fahs and Miss R. B. Deans.	25	76	5	23	52.3	2.90
Carlowville	....do	H. L. Alison	30	76	5	19	50.0	3.61
Havana	Hale	H. Tutwiler, LL. D	26	74	5	16	49.0	2.35
FLORIDA.								
Near Port Orange	Volusia	S. W. Chamberlin	27	76	7	32	56.5	3.98
Jacksonville	Duvall	A. S. Baldwin, M. D	2	88	6	29	57.0	2.15
Picolata	St. John's	C. F. Powell	23	79	6	37	59.4	------
Tampa	Hillsborough	W. F. White	23, 25, 26, 30	78	21	31	57.3	3.00
Wellborn	Suwannee	Geo. R. Thralls	11, 30	78	21	30	57.1	2.30
Newport	Wakulla	Chas. Beecher	8	74	21	28	51.3	------
TEXAS.								
Clarksville	Red River	Rev. John Anderson	30	77	20	21	49.0	------
Near Clarksville	....do	Allen Martin	30	73	20	19	43.9	0.39
Houston	Harris	Miss E. H. Boxter	18	84	4	28	56.5	------
Sand Fly	Bastrop	F. S. Wade	31	82	5	23	51.5	0.35
Bluff	Fayette	Joseph Fietsom	22	77	4	24	52.8	0.50
Clinton	DeWitt	A. C. White, M. D	25	80	5	24	53.1	0.50
Austin	Travis	J. Van Nostrand	19	78	4	22	49.9	1.00
Clear Creek	Galveston	George N. Leoni	19	80	4	29	53.5	2.60
LOUISIANA.								
New Orleans	Orleans	R. W. Foster	25, 31	80	5, 6	29	------	3.26
Pouchatoula	Livingston	H. Collins	23	81	5	24	55.6	3.98
MISSISSIPPI.								
Columbus	Lowndes	J. F. Tarrant	18, 23, 30	74	6	21	46.2	1.76
Marion Station	Lauderdale	T. W. Florer, M. D	25	78	5	18	46.0	1.90
Holly Springs	Marshall	T. B. Coleman	25, 31	70	21	16	39.1	4.10
Grenada	Grenada	J. L. Payne	7	79	6	18	46.4	2.20
Near Brookhaven	Lawrence	Mrs. W. E. Keenan	30	80	5	19	52.3	1.40
ARKANSAS.								
Pocahontas	Randolph	J. P. Martin, M. D	30	74	4	8	33.6	1.80
Mineral Spring	Hempstead	Harmon Bishop	31	70	4	14	43.9	0.75
TENNESSEE.								
Elizabethton	Carter	C. H. Lewis	31	72	21	— 6	36.4	0.85
Greeneville	Greene	S. S. & Rev. W. S. Doak	30	70	21	— 1	35.5	0.81
Knoxville	Knox	J. K. Payne	31	68	21	6	36.9	3.27

Table showing the highest and lowest range of the thermometer, &c.—Continued.

State and station.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain and melted snow.
TENN.—Continued.				*Deg.*		*Deg.*	*Deg.*	*In.*
Clearmont	Warren	T. P. Wright	30	69	21	6	38.9	2.86
Austin	Wilson	P. B. Calhoun	30, 31	72	4, 20, 21	8	39.2	3.44
Clarksville	Montgomery	Prof. W. M. Stewart	30	69	21	3	36.0	2.54
Trenton	Gibson	W. T. Grigsby	30	73	4, 20	13	38.6	2.50
La Grange	Fayette	W. E. Franklin, M. D.	30	70	21	13	40.0	2.20
KENTUCKY.								
Pine Grove	Clark	S. D. Martin, M. D.	31	63	21	— 8	30.8	4.18
Shelby City	Boyle	Howard Shriver	30	66	21	— 6	34.6	3.08
Near Louisville	Jefferson	Mrs. L. Young	30	64	21	— 3	31.8	3.05
Blandville	Ballard	E. W. Horr	30	70	20, 21	2	34.6	3.55
OHIO.								
Salem	Columbiana	J. E. Pollock	31	57	21	—18	25.1	1.50
Martin's Ferry	Belmont	C.R.&MarthaB.Shreve	23	63	21	—12	29.2	.....
Painesville	Lake	E. J. Ferris	31	55	21	— 8	25.5	3.80
Adams's Mills	Muskingum	C. A. Stilwell	31	58	21	—14	26.7	2.85
Pennsville	Morgan	T. J. Bingham	23	63	21	—14	28.6	2.20
Gallipolis	Gallia	A. P. Rodgers	31	70	21	— 8	30.8	1.38
Oberlin	Lorain	L. Herrick	31	56	21	—18	24.4	1.63
Sandusky	Erie	Thomas Neill	30	47	20	— 3	25.5	1.68
Carson	Huron	Mrs. M. M. Marsh	3	58	20, 21, 28	— 6	29.2	.....
North Fairfield	....do	O. Burrass	30, 31	58	21	—18	26.4	1.96
Westerville	Franklin	Prof. J. Haywood	23	55	21	—16	26.8	2.16
North Bass Island	Ottawa	Geo. R. Morton, M. D.	23	51	21	— 7	24.9	1.86
Marion	Marion	H. A. True, M. D.	30	54	21	—17	24.8	2.52
Hillsborough	Highland	J. McD. Mathews	23	56	21	— 7	28.5	3.06
Kenton	Hardin	C. H. Smith, M. D	31	65	21	—13	25.5	1.75
Bellefontaine	Logan	William Barringer	31	56	21	—12	25.0	2.45
Urbana University	Champaign	M. G. Williams	30	58	21	—17	26.2	2.30
Bethel	Clermont	G. W. Crane	30	60	21	—15	27.3	3.37
Farmer	Defiance	A. C. Irwin	23	56	21	—18	23.8	2.60
Carthagena	Mercer	Prof. W. R. Mueller	23, 31	62	21	—10	28.7	3.45
Jacksonburgh	Butler	J. B. Owsley, M. D	23, 31	58	21	— 8	28.2	2.95
Oxford	....do	R. W. McFarland	23	58	21	—12	26.8	3.60
Mount Auburn Ins.	Hamilton	Prof. I. H. White	31	68	21	— 6	29.5	3.38
Cumminsville	....do	J. H. Shields	30	47	21	— 8	27.6	4.65
Cincinnati	....do	G. W. Harper	31	61	21	— 5	30.5	3.31
Do	....do	R. C. Phillips	23	61	21	— 3	28.8	3.90
College Hill	....do	J. W. Hammitt	23, 30, 31	56	21	—10	28.1	3.11
MICHIGAN.								
Alpena	Alpena	J. W. Paxton	23	35	20	— 9	20.0	1.16
Detroit	Wayne	F. W. Higgins	23	52	21	—22	22.3	1.56
Monroe City	Monroe	Thomas Whelpley	23	52	21	—10	27.7	0.76
State Agr. College	Ingham	Prof. R. C. Kedzie	23	51	20	—23	21.2	1.76
Litchfield	Hillsdale	R. Bullard	23	46	20	—19	21.1	2.18
Olivet College	Eaton	Prof. A. F. Kemp	23	48	20	—17	20.5	2.55
Grand Rapids	Kent	E. S. Holmes, D. D. S	23	43	20	—12	22.1	2.14
Northport	Leelenaw	Rev. G. N. Smith	23	43	20	— 6	21.0	.....
Benzonia	Benzie	William Wilson	23	38	20	— 1	21.1	4.70
Ontonagon	Ontonagon	E. Ellis, M. D	16	34	20	—14	11.5	2.05
INDIANA.								
Fort Wayne	Allen	R. S. Robertson	23	53	21	—15	24.6	2.75
Mt. Carmel	Franklin	J. A. Applegate and daughter.	30, 31	56	21	— 6	28.6	2.45
Aurora	Dearborn	George Sutton, M. D.	31	60	21	— 9	23.9	3.20
Vevay	Switzerland	C. G. Boerner	30	64	21	— 7	30.5	2.75
Knightstown	Rush	D. Deem	31	57	21	—15	26.0	2.11
Beech Grove	....do	William S. Clark	30	58	21	—12	26.2	2.85
Livonia	Washington	J. K. Howard	30	62	21	— 8	26.4	2.75
Laconia	Harrison	Adam Crozier	30	68	21	— 2	31.2	3.69
Steam Corner	Fountain	B. C. Williams, M. D.	30	56	21	— 7	23.9	2.80
Merom	Sullivan	Thomas Holmes	30	62	21	— 1	28.5	2.90
New Harmony	Posey	John Chappellsmith	30	64	21	2	31.2	2.23

Table showing the highest and lowest range of the thermometer, &c.—Continued.

State and station.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain and melted snow.
ILLINOIS.								
				Deg.		*Deg.*	*Deg.*	*In.*
Near Chicago	Cook	Samuel Brookes	11, 12	46	5	— 8	21.7	.....
Evanston	....do	Prof. O. Marcy	23	44	5	—10	19.7	1.30
Marengo	McHenry	J. W. James	11	40	5	—16	16.1	1.93
Aurora	Kane	A. Spaulding, M. D.	11, 12, 30	44	21	—15	18.9	2.18
Louisville	Clay	D. H. Chase, M. D	30	64	21	— 2	28.0	2.35
Belvidere	Boone	J. B. Morse	11	43	20	—21	15.6	1.96
Decatur	Macon	Timothy Dudley	7	46	5	— 6	23.6	1.15
Wyanet	Bureau	E. S. & Miss I. G. Phelps	12	48	21	—13	19.6	3.98
Tiskilwa	....do	Verry Aldrich	11	46	21	—11	21.1	.....
Hennepin	Putnam	Ethan Osborn	12	48	20, 21	—12	21.5	1.90
Dubois	Washington	W. C. Spencer	30	68	21	— 4	28.1	1.65
Peoria	Peoria	Fred. Brendel	30	50	4, 5	— 6	24.4	2.04
Havana	Mason	Jos. Cochrane	30	56	4	— 7	23.5	2.40
Galesburgh	Knox	Prof. W. Livingston	30	43	4	— 9	21.0	1.60
Waterloo	Monroe	Chas. Jozefé	30	62	4, 20	— 3	26.3	1.55
Manchester	Scott	Dr. J. & Mrs. M. Grant	29	58	4	— 4	24.9	2.70
Near Manchester	....do	Peter Murray	30	56	4	— 5	25.1	.....
Mt. Sterling	Brown	Rev. A. Duncan	30	56	4, 27	— 2	26.5	2.25
Oquawka	Henderson	H. N. Patterson	11	53	4	— 8	23.0	1.99
Augusta	Hancock	S. B. Mead	30	50	4	— 9	23.4	1.31
Warsaw	....do	B. Whitaker	30	55	4	— 8	23.4	1.44
Quincy	Adams	F. J. Heance, C. E	30	58	4	— 5	24.6	1.50
WISCONSIN.								
Sturgeon Bay	Door	Mrs. C. C. Pinney	30	38	20	—15	14.9	1.67
Manitowoc	Manitowoc	Jacob Lups	30	40	5, 20	—14	16.3	2.04
Hingham	Sheboygan	J. de Lyser	12, 23, 30	40	5, 20	—13	16.1	.....
Milwaukee	Milwaukee	J. A. Lapham, LL. D	24	47	5	—13	17.8	2.03
Geneva	Walworth	W. H. Whiting	11	43	5	—17	15.5	1.20
Waupaca	Waupaca	H. C. Mead	3, 30	40	27	—18	15.6	.....
Embarrass	....do	E. E. Breed	11	40	20	—27	9.6	2.54
Edgerton	Rock	H. J. Shiuts	11	44	20	—14	17.0	.....
Rocky Run	Columbia	W. W. Curtis	11	42	29	—26	14.2	2.38
Madison	Dane	W. W. Daniells	11	39	5	—15	14.3	1.15
Mosince	Marathon	J. O'Donoghue	11	39	20	—25	9.3	2.94
Baraboo	Sauk	M. C. Waite	11	38	20	—22	15.3	5.75
New Lisbon	Juneau	J. L. Dangan	12	46	27	—17	14.2	.....
Bayfield	Bayfield	Andrew Tate	11	40	26	—22	8.6	.....
MINNESOTA.								
Beaver Bay	Lake	C. Wieland	10	46	20, 27	—20	10.6	0.93
Beaver	Winona	J. K. P. Winters	11	36	27	—22	6.9	.....
Afton	Washington	A. L. Roe	10	42	4	—27	14.5	1.90
Saint Paul	Ramsey	Rev. A. B. Peterson	6	43	5	—24	9.1	0.87
Minneapolis	Hennepin	William Cheney	6	41	27	—29	5.8	1.12
Sibley	Sibley	C. W. & E. W. Woodbury	6	38	4	—21	7.5	0.43
Litchfield	Meeker	H. L. Wadsworth	11	34	4, 27	—20	4.4	.....
New Ulm	Brown	Charles Roos	10	40	4	—18	10.0	.....
Oak Lake	Becker	D. Pyle, M. D.	10	35	25	—20	6.2	.....
IOWA.								
Monticello	Jones	Prof. J. E. Jones	11	45	20	—17	14.9	2.38
Durant	Cedar	F. A. Ross	6	44	5, 27	—14	16.4	3.30
West Branch	....do	A. M. Russell	6	46	27	—17	16.9	5.90
Guttenberg	Clayton	J. P. Dickerson	6	42	27	—20	12.2	.....
Mount Vernon	Linn	Prof. A. Collins	6	44	5	—16	15.4	.....
Iowa City	Johnson	T. S. Parvin	6	44	27	—13	15.8	2.67
Fort Madison	Lee	D. McCready	30	49	4	— 8	22.2	1.30
Independence	Buchanan	George Warne, M. D	2, 6	41	27	—20	13.2	1.55
Near Independence	....do	Mrs. D. B. Wheaton	6	40	27	—20	11.9	1.20
Cresco	Howard	Gregory Marshall	6, 30	36	5, 27	—23	8.7	0.86
Rockford	Floyd	H. Wadey	30	38	27	—12	14.9	2.05
Algona	Kossuth	J. H. Warren	11	44	4	—17	10.9	.....
Fontanelle	Adair	A. F. Bryant	6	55	27	—15	17.3	.....
Sac City	Sac	D. B. Nelson	6	42	4	—18	12.8	4.40
Council Bluffs	Pottawattomie	Benjamin Talbot	6	49	4	— 9	18.6	0.85
Do	....do	D. R. Witter	10	55	27	—27	17.3	.....
Logan	Harrison	J. T. Stern	6	50	4, 27	—14	17.4	1.30

Table showing the highest and lowest range of the thermometer, &c.—Continued.

State and station.	County.	Observer.	Date.	Maximum temperature.	Date.	Minimum temperature.	Mean temperature.	Rain and melted snow.
MISSOURI.				*Deg.*		*Deg.*	*Deg.*	*In.*
St. Louis University	St. Louis	A. Averbeck	30	64	4	2	31.3	1.05
Hematite	Jefferson	J. M. Smith	30	71	21	− 7	31.7	1.20
Rolla	Phelps	H. Ruggles	30	70	4	0	29.9	1.45
Jefferson City	Cole	N. De Wyl	30	60	4	− 2	28.1	.....
North Springfield	Greene	R. H. McCord	30	66	4	− 6	28.0	0.70
Mount Vernon	Lawrence	Wyatt Harris	30	66	4	− 2	29.7	0.72
Kansas City	Jackson	S. W. Salisbury	9	56	27	0	28.9	0.75
Nevada	Vernon	P. J. Bond	30	62	4	− 3	28.3	3.00
Oregon	Holt	William Kaucher	6	56	4	−10	21.9	2.42
Corning	....do	H. Martin	6	54	27	−11	20.5	0.65
Saint Joseph	Buchanan	H. Bullard	6	54	4	− 2	26.8	0.76
KANSAS.								
Olathe	Johnson	Watts Beckwith	6	58	4,27	− 6	23.8	0.20
Paola	Miami	L. D. Walrad	30	54	4	− 4	26.9	1.66
Baxter Springs	Cherokee	William Hyland	30	60	4	0	30.3	4.50
Leavenworth	Leavenworth	Dr. J. Stayman	6	62	27	− 8	23.2	1.28
Atchison	Atchison	Dr. H. B. and Miss M. Horn.	6	60	27	−14	22.7	1.65
Williamstown	Jefferson	J. M. Cotton	11	68	4	− 8	24.4	1.21
Near Williamstown	....do	....do	30	54	4	− 6	27.1	1.21
Lawrence	Douglass	F. H. Snow	6	58	4	− 6	24.9	1.12
Williamsburgh	Franklin	D. Fogle	6	57	4	− 5	25.6	0.80
Holton	Jackson	J. Watters, M. D.	6	62	27	−10	22.8	.....
Le Roy	Coffey	J. G. Shoemaker	30	56	20	− 6	29.2	1.45
Manhattan	Riley	Prof. B. F. Mudge	15	53	27	− 6	24.7	0.35
Council Grove	Morris	A. Woodworth, M. D.	6	54	4	− 6	25.8	0.60
Holden	Sedgwick	A. G. Richardson	12	50	4,27	− 3	24.3	0.40
NEBRASKA.								
De Soto	Washington	Charles Seltz	6	47	4,27	−13	16.8	1.30
Bellevue	Sarpy	Mrs. E. E. Caldwell	6	53	27	−19	17.5	1.01
Emerson	Otoe	William Dunn	6	50	4	−16	16.1	1.30
Omaha Agency	Blackbird	Rev. William Hamilton	6,11,15	50	4	−11	18.2	1.15
Santee Agency	L'Eau qui Court	G. S. Truman	6	47	4	−15	15.4	0.90
UTAH.								
Coalville	Summit	Thomas Bullock	28	45	10,11	− 6	27.7	1.98
COLORADO.								
Denver City	Arapahoe	William N. Byers	9	55	19	− 2	31.3	0.77
Fountain	El Paso	C. I. Croft	6	70	14,22,23	12	34.5	0.09
Colorado Springs	....do	E. S. Nettleton	6	60	17,22	7	31.6	0.33
NEW BRUNSWICK.								
St. John	St. John	Gilbert Murdock	24	45	21	−10	20.4	2.50
NOVA SCOTIA.								
Wolfville	.....	D. F. Higgins	23	49	21	0	25.0	2.06

NOTES OF THE WEATHER—DECEMBER, 1871.

Mount Desert, Me.—A gale in the night blew down chimneys and carried off the snow 23d.

Montville, Me.—Penobscot River frozen for the first time 1st; snow during the night 7th.

West Waterville, Me.—Sleet, hail, and rain 4th; snow 7th, 10th, 14th, 23d, 27th, and 29th.

Oxford, Me.—Coldest day in four years 21st.

Lisbon, Me.—Teams cross Androscoggin River on ice about nine days sooner than usual for the last ten years 1st. Fine display of aurora borealis in the evening 8th. First sleighing 19th.

Standish, Me.—Snow fell on seven days, and rain on twelve; warm days 24th and 25th.

Stratford, N. H.—Wells low; some small streams freezing and drying up; mills doing but little, some have stopped. Snow on eighteen days, seventeen inches in all.

Tamworth, N. H.—A very cold December. Snow enough for good sleighing; the ground is frozen two feet deep. Swamps are quite dry, wells and streams are low.

Craftsbury, Vt.—A month remarkable for sudden changes. Snow fell on twenty days, and rain on three.

Woodstock, Vt.—Ice in the river twenty inches thick 22d; wells and streams low.

Near St. Albans, Vt.—Heavy wind during the night 23d; poor sleighing 31st.

West Charlotte, Vt.—First three days beautiful, with the haze of Indian summer; month unusually cold.

Castleton, Vt.—Thunder-storm south and southeast 23d; have been but few phenomena this month; very cloudy.

New Bedford, Mass.—No ice in the river; no snow on the ground; very little frost; roads muddy 31st.

Cambridge, Mass.—Rain 4th, 23d, and 26th; snow on nine days, not enough altogether for two days' sleighing.

North Billerica, Mass.—Snow nearly gone; ice-cutting suspended; streams pretty full 31st.

Newport, R. I.—Half-inch of snow, the first of the season, 7th; a gale from the south, and copious showers from 1 to 4 a. m. 24th.

Moriches, N. Y.—Remarkably mild and beautiful 24th.

Argyle, N. Y.—The month noted for violent changes of temperature.

Brooklyn, N. Y.—A singular storm, commencing with snow, changing to sleet, hail, and rain in succession, 29th; stars visible 21 evenings.

Glasco, N. Y.—Hudson closed from Albany to Rondout 6th; thunder and lightning 31st.

Middleburgh, N. Y.—The afternoon and night of the 23d a gale of "hot south wind" carried off 8 inches of snow, broke up the ice 10 inches thick in Schoharie River, and raised the water very high, causing serious damage.

Cooperstown, N. Y.—Otsego Lake closed 21st; a very changeable month—severely cold and very mild; good sleighing for a week, in the middle of the month; none on the 31st.

Gouverneur, N. Y.—Heavy thunder, sharp lightning, and high wind at 4 p. m. 23d.

Depauville, N. Y.—Twenty rainy days during the month.

Newark Valley, N. Y.—Thunder-shower 6 p. m. 31st.

Buffalo, N. Y.—The coldest December in thirteen years, with more than the average of high winds.

South Orange, N. J.—Ice six inches thick 3d; first sleighing 20th; sleighing gone 24th; frost all out of the ground 27th.

Moorestown, N. J.—"Stern, straight-along winter through the month."

Vineland, N. J.—Month cold and severe.

Fallsington, Pa.—Delaware River closed at Trenton, N. J., 5th; rain-storm 23d; Delaware River broke up at Trenton, N. J., 24th; a very cold month.

Tioga, Pa.—Diffuse lightning; thunder in the distance 31st; many springs and wells are dry that never were known to fail before.

York Sulphur Springs, Pa.—Month remarkably dry.

Greensburgh, Pa.—Coldest day in fifteen years 21st; thermometer 68°, the warmest Christmas for fifteen years, 25th; first thunder and lightning since October 31st.

Tarentum, Pa.—Allegheny River broke up very abruptly, the ice eight inches thick, 26th; coal and lumber men have sustained much damage.

New Castle, Pa.—Lightning, with loud and prolonged thunder, 31st.

Beaver, Pa.—The coldest night in five years 21st; lightning and heavy thunder 31st; month very dry.

Cannonsburgh, Pa.—Thunder, lightning, rain, and hail 31st.

Woodlawn, Md.—Susquehanna River closed at Port Deposit for the month 2d; light rain, freezing as it fell, 29th and 30th; melted away 31st.

Fallston, Md.—The lowest range of the thermometer in the last seven years 21st; the dryest month since February; thickest ice eight inches.

Sam's Creek, Md.—Month dry, water failing.

Emmittsburgh, Md.—The coldest day recorded for several years 21st.

Caperville, Va.—The coldest day since December 16th, 1866, 21st.

Surry C. H., Va.—A remarkable month, rainy, wet, and very changeable; changes sudden; temperature either extremely cold or warm.

Accotink, Va.—Very little rain or snow during the month.

Wytheville, Va.—Very little rain during the month; many springs and wells dry; wheat suffering from hard freezing, having no snow for protection.

Tarborough, N. C.—Snow three inches 1st.

Oxford, N. C.—Light snow 1st; snow followed by rain 3d.

Fayetteville, N. C.—Snow-fall of November 30th continued to 10 a. m. 1st, measuring nine inches, the heaviest fall of snow since 1855.

Albemarle, N. C.—Thunder in the southwest 23d, 24th, and 31st; the dryest, coldest, and most changeable December in many years; a few days as cold as the coldest winter, then for as many days in succession genial spring weather.

Statesville, N. C.—Six inches of snow 15th; cloudy, misty, freezing all day, trees loaded, and ground covered with ice 22d.

Asheville, N. C.—Heavy rain all day 23d.

Gowdeysville, S. C.—Snow four and a half inches 1st; four inches of snow 15th; month colder than usual; changes of temperature sudden and extreme.

Berne, Ga.—Temperature of well-water 15 feet below the surface of the ground 59°, 1st; water froze during the night, 5th; thunder and lightning in the north 23d and 24th.

Macon, Ga.—Rain, with an unusual amount of thunder and lightning, 23d and 24th.

Moulton, Ala.—A few cold days; several white frosts; no snow to lie

upon the ground; no very heavy rains; the latter portion of the month mild and pleasant.

Near Port Orange, Fla.—Ground froze slightly 6th; heavy white frost 7th.

Tampa, Fla.—Frost 5th, 6th, and 7th.

Newport, Fla.—A delightful month.

Austin, Texas.—Sleet and snow 1st; frost 1st, 5th, 15th, and 24th; violent north wind with thunder and lightning 22d; diffuse lightning 31st.

Brookhaven, Miss.—White frost 1st, 2d, 5th, 6th, 11th, 15th, 16th, and 21st; but one entirely clear day this month, but the weather pleasant most of the time.

Ponchatoula, La.—First killing frost 5th; thunder-showers 23d and 31st; strawberries ripe and ripening 31st.

Pochahontas, Ark.—Sleet 2d; ice two inches thick 4th; ground frozen four inches 6th; drizzly, ice forming in the ground 22d; storm of thunder and lightning, wind in gusts, rain in showers 31st.

Elizabethton, Tenn.—Ground froze three inches deep 22d; the month remarkable for sudden and extreme changes of temperature; rain-fall small.

Shelby City, Ky.—First skating 2d, continuing to 21st; month very cold—first half dry, the last rainy.

Mt. Auburn, Ohio.—Miami Canal closed 5th; Ohio River closed 21st; continuous heavy thunder-showers 31st.

Martin's Ferry, Ohio.—Ohio River closed twice during the month; rain, thunder, and lightning 31st.

Pennsville, Ohio.—Several very heavy thunder-showers during the day, 31st.

Northport, Mich.—Weather severe; much more snow than usual; feed scarce.

Litchfield, Mich.—Not a day's sleighing during the month, but excellent wheeling; springs unusually low 31st.

Monroe, Mich.—Tornado from southwest, unroofing buildings, and throwing down parapets 23d.

Grand Rapids, Mich.—Sleighing nearly all the month; snow not deep at any time; weather unusually cold, cloudy, and windy.

Mt. Carmel, Ind.—Very warm, thunder and lightning 23d; very foggy with sleet 29th; very heavy thunder and bright zigzag lightning in the west 31st; very dry month; water scarce in wells and springs; some are hauling water for stock.

Laconia, Ind.—First half of the month dry and pleasant; not a clear day in the last half.

Knightstown, Ind.—Frost in the ground all the month.

Dubois, Ill.—Gale from southwest all day, fences and chimneys blown down, 23d; violent thunder-storm, the wind blowing fiercely 31st; month unusually dry.

Manchester, Ill.—Weather has been very changeable; a good deal of rain and thunder; the atmosphere smoky.

Hennepin, Ill.—Illinois River closed by ice 1st; ice on the river fourteen inches thick 31st.

Belvidere, Ill.—Bad sleighing and wheeling until 17th, afterward fair sleighing; first week cold, second moderate, third very severe, fourth severe.

Embarrass, Wis.—A cold month with only one clear day.

Manitowoc, Wis.—The coldest December in twenty-one years.

Rocky Run, Wis.—The coldest December since 1859.

Bayfield, Wis.—Snow 3d, 15th, 22d, 23d, and 29th; snow, hail, and rain 12th; harbor closed by ice 19th.

Oak Lake, Minn.—The severest December ever known here, and the greatest fall of snow for the month. Winter began the 18th of November, and has been hard ever since.

Minneapolis, Minn.—The coldest December since 1859.

Algona, Iowa.—A very cold month, but good weather for work.

Logan, Iowa.—The coldest December in ten years; good sleighing since the 17th; very little snow before that day.

Fontanelle, Iowa.—Thirteen inches of snow fell from 21st to the 23d; the coldest December on record.

Cresco, Iowa.—Cold intense and unexpected; frozen faces and extremities numerous; fevers, rheumatism, and severe colds prevalent; stock not well housed or fed suffering badly.

Durant, Iowa.—The rain of last night froze as it fell, coating everything exposed with ice three-fourths of an inch thick; trees damaged severely 23d.

Mt. Vernon, Mo.—A violent gale attended with thunder and lightning night of the 22d; much thunder and lightning night of the 30th.

Williamstown, Kans.—Weather beautiful, no snow 15th; cloudy 16th; stock doing well.

Manhattan, Kans.—Ice in the river eight and a half inches thick 5th; a dry, cold month.

Burlingame, Kans.—The severest month known to the oldest inhabitants; bare ground is frozen a foot deep; small streams frozen; nearly dry; changes of weather have been sudden and extreme.

Emerson, Nebr.—Depth of frozen ground one foot and four inches 26th.

Harrisburgh, Utah.—A fine month; the weather the last part very pleasant and warm; farmers cannot sow for want of water to irrigate their ground; no grass; farmers driving stock seventy-five miles east for pasture; breadstuffs very scarce; flour $10 per hundred.

Denver, Colo.—Ground thickly covered with snow the entire month, the mean temperature nearly eight degrees above that of December, 1870.

Colorado Springs, Colo.—The winter thus far has been unusually severe in the northern and eastern parts of the Territory; stock is suffering, and much will doubtless starve.

MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

FEBRUARY, 1872.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1872.

MONTHLY REPORT.

DEPARTMENT OF AGRICULTURE, STATISTICAL DIVISION,
Washington, D. C., February 29, 1872.

SIR: I herewith present, for publication, the results of the annual investigation concerning the prices of farm animals, and their numbers in comparison with the statement of the previous year; also, a brief account of the recent agricultural convention; an article upon forests and the public lands; a record of the yield and profit of agricultural operations on a western farm; notes of the garden; entomological records; chemical memoranda; scientific notes; and facts from various sources.

Very respectfully,

J. R. DODGE,
Statistician.

Hon. FREDERICK WATTS,
Commissioner.

COMPARATIVE NUMBERS AND PRICES OF FARM-STOCK.

The February circular to statistical correspondents, which invites statements of comparative numbers and prices of farm-stock in the counties of the several States, has been quite fully responded to; and a careful combination of these local estimates and statements of fact indicates a small increase in each kind of domestic animals, except sheep, in which a decrease of about one per cent. is apparent. The largest increase is reported in swine, amounting to six per cent., though their numbers had been thinned by the heavy operations of the pork-packing establishments. The Department estimate of fattening hogs in September was about twelve per cent. greater than in the previous year, and, in many of the Western States, an increase of fully 25 per cent. of swine, old and young together, was apparent. Horses and mules are credited with an increase of about 3 per cent.; milch cows, 2 per cent.; and oxen and other cattle, 1 per cent.

The only States in which a decrease of horses is presented are—Maine, 5 per cent.; New Hampshire, 4; Rhode Island, 2; Connecticut, 1, and California 1. An increase of 1 per cent. appears in New York,

New Jersey, Pennsylvania, Maryland, Mississippi; 2 per cent. in Massachusetts, South Carolina, Georgia, Louisiana, West Virginia, Ohio, Indiana, Illinois; 3 per cent. in Virginia, North Carolina, Alabama, Kentucky, Michigan; 4 per cent. in Florida, Texas, Tennessee; 6 per cent. in Wisconsin and Missouri; 7 per cent. in Arkansas and Oregon; 8 per cent. in Iowa; 16 per cent. in Kansas, and 20 per cent. in Nebraska.

In mules a loss of 1 per cent. is indicated in New York, Pennsylvania, and Indiana; of 2 per cent. in Kentucky; of 3 per cent. in Michigan; and 4 per cent. in California. The remaining States (New England unreported from paucity of numbers) show an increase in nearly the same ratio locally as in the case of horses. In Iowa and Kansas the increase of horses is much greater than that of mules.

In returns of milch cows, no States show a decrease except Maine, New Hampshire, Vermont, Rhode Island, and Connecticut. The apparent increase throughout the country is about two per cent., the greatest appreciation being in the new States receiving large accessions to their agricultural population, as 20 per cent. in Nebraska, 18 in Kansas, 10 in Iowa and Minnesota, 6 in Missouri and Arkansas, 5 in Wisconsin. Greater prominence is beginning to be given to the dairy interests in the South, the mountainous districts of which are admirably adapted, by reason of their mildness and equability of temperature, nutritious and abundant grasses, and cool springs, to the making of butter and cheese.

The failure of the hay crop in the Eastern States has caused a further reduction in the numbers of "oxen and other cattle," and a decrease is also reported in other States as follows: New York, 1 per cent.; Pennsylvania, 5; Georgia, 2; Florida, 4; Texas, 3; California, 5. Most of the Western States indicate more or less increase—Michigan, 2 per cent.; Illinois, 1; Wisconsin, 8; Minnesota, 10; Iowa, 7; Missouri, 5; Kansas, 15; Nebraska, 20; Oregon, 7. The aggregate increase is little more than one per cent.

The advance in the price of wool will stimulate the enlargement of flocks from the lambs dropped the present spring, but the stagnation in wool-growing of several years past was not removed in season to affect the number kept over the present winter. The States reporting a slight advance are Vermont, 6 per cent.; Texas, 9 per cent.; Arkansas, Michigan, Wisconsin, Kansas, Nebraska, (25 per cent.); California and Oregon, (16 per cent.) There has been an increase in the Territories, of which reports have not been very full.

Relative to swine, the numbers of last year have not been sustained in any of the Eastern States, in Maryland, Louisiana, and California. The Southern States appear to be giving more attention to the production of pork, and a marked increase of numbers is manifest in the Western States, those making the greatest advance being Nebraska, 35 per cent.; Kansas, 25; Iowa, 16; Missouri, 15; Illinois, 7; Indiana and Kentucky, 6 per cent.

PRICES.

The prices of farm-stock are still lower than in February, 1871, for all kinds excepting sheep, which have appreciated materially in value. While neat-stock will average lower rates, the decline is neither uniform nor universal; a demand for horned stock in the South, especially milch cows, having stiffened current prices in some localities, which are yet low compared with the better rates for improved northern cattle.

The decline in horses is quite general. In Texas a small advance is

noticed. A comparison with last year in a few of the States will illustrate the ratio of decrease.

States.	1872.				1871.			
	One year.	Two years.	Three years.	Over three years.	One year.	Two years.	Three years.	Over three years.
New Jersey	$52.30	82.30	116.53	148.57	58.50	93.07	130.53	163.21
Georgia	38.70	61.41	87.36	113.29	40.20	63.54	92.53	129.45
Ohio	33.42	51.82	76.86	102.28	34.70	54.00	79.47	102.92
Kentucky	33.39	49.19	68.00	89.67	36.14	52.75	72.42	96.35
Illinois	28.43	41.83	59.90	88.26	28.57	44.60	66.66	93.93
Texas	12.43	18.72	30.08	46.23	12.06	18.19	26.96	45.52

The rates at which horses are held in Texas are still less than in any other State, but they are gradually advancing, the appreciation being more noticeable in the serviceable and salable ages than in yearlings or colts. The difference in values seen in the accompanying table is occasioned quite as much by breed and selection for special uses, as by the location with reference to the great centers of business and population.

The price of mules has declined nearly in the same proportion. As compared with the record of last year, the following examples of prices of animals three years old and upward, will illustrate this decline: In Illinois, $114 44 to $107 95; in Kentucky, $115 14 to $112 89; in Tennessee, $128 to $119 12; in Georgia, $139 86 to $130; in Texas, $73 60 to $67 60.

A heavy decline is recorded in the value of neat-stock. Prices are lower than for seven years past, except in Texas, where appreciation is resulting from the heavy drain upon the stock-reserves made for several years past by the drovers. In 1869 prices of cows attained their highest limit, since which date the tendency has been downward, especially during the past year. An illustration of the changes during this period, in different sections of the country, is presented in the following table:

States.	1872.	1871.	1870.	1869.	1868.	1867.	1866.
Massachusetts	$39.87	59.16	57.00	67.50	67.11	59.80	62.00
New York	39.53	48.51	54.11	54.14	52.54	57.22	54.14
Pennsylvania	39.16	46.67	46.83	47.11	44.94	47.36	51.18
Ohio	37.36	45.09	44.77	43.00	43.07	44.94	47.33
Michigan	36.86	41.15	42.94	44.62	42.30	47.27	43.54
Illinois	33.77	37.68	37.02	38.11	36.62	35.90	34.84
Iowa	28.49	34.31	34.91	36.13	31.10	31.35	30.12
Missouri	25.85	31.92	32.32	31.21	29.04	29.86	32.87
Kansas	30.77	38.46	37.42	30.67	29.88	32.11	27.94
Tennessee	22.83	23.57	29.07	28.04	25.08	27.88	.....
Georgia	20.81	21.61	22.48	22.36	21.06	21.64	.....
Texas	14.12	12.83	10.67	9.12	10.29	11.20	.....

Oxen and other cattle have declined in value quite heavily in the Eastern States, partly as a result of the general depreciation, and obviously from the scarcity of hay and other feed, causing a feeling of discouragement unfavorable to high prices. In the Middle States, cattle of the age of three years and upward average about $50; last year $64. The ratio of decline has been small in the South, where the rates

are low, the breed inferior, and where the need of more and better stock is beginning to be felt. Lower prices prevail in the Ohio Valley, but in Wisconsin and Minnesota, where cattle are gradually assuming their place in the farm economy, as wheat culture becomes unprofitable, rates are very well sustained. In the Missouri Valley the depreciation is even heavier than in the Ohio Valley. It is hoped that the bottom has been reached, and that the prices of farm-stock may not continue to suffer a greater depreciation than that which affects other branches of productive industry.

Sheep are the only animals of the farm that command higher rates. The advance in price, with the enhancing value of wool, is greatest in the principal wool-growing States. In Vermont the average price of a sheep not less than one year old, has advanced since February of last year from $2 75 to $4 56; in New York, from $3 37 to $4 32; in Pennsylvania, from $3 45 to $3 70; in Ohio, from $2 49 to $3 37; in Michigan, from $2 45 to $3 14; in Illinois, from $2 15 to $2 90; in Iowa, from $1 88 to $2 41; in California, from $2 84 to $3 08; in Texas, from $1 59 to $1 73. The Southern States have few sheep, and have not felt the appreciation materially.

The decline in the value of hogs is very marked, as will be seen from a comparison of our returns for the past four years in the principal pork-producing States. Something of the difference noted in the average prices of the different States is due to degrees of improvement in quality, and difference in average weight, relative amount of feed, care, &c.

States.	1872.		1871.		1870.		1869.	
	Under 1 year.	Over 1 year.	Under 1 year.	Over 1 year.	Under 1 year.	Over 1 year.	Under 1 year.	Over 1 year.
Kentucky	$2 55	$5 71	$3 65	$8 30	$4 26	$10 88	$4 46	$10 35
Ohio	3 93	9 07	6 20	12 97	6 95	16 76	6 33	15 53
Michigan	3 54	8 06	5 39	13 34	5 27	12 97	5 29	12 40
Indiana	2 98	6 79	4 72	10 01	5 09	12 37	4 91	11 56
Illinois	3 78	7 48	5 79	12 71	6 32	13 65	6 15	15 23
Wisconsin	3 51	7 14	6 28	12 91	6 41	14 35	5 35	13 45
Minnesota	4 04	8 64	5 05	11 29	5 78	12 13	5 54	12 91
Iowa	3 71	7 94	5 28	12 79	6 47	14 90	6 02	14 41
Missouri	2 18	4 78	3 37	7 28	3 53	8 00	2 70	7 03
Kansas	4 27	9 25	6 93	14 73	5 16	12 73	4 95	12 46

Table showing the relative percentage of numbers and prices of farm-stock in February, 1872, as compared with the returns of February, 1871.

STATES.	HORSES.					MULES.					MILCH COWS.	
	Total number of horses compared with that of February, 1871.	Average price per head under 1 year old.	Average price per head between 1 and 2 years old.	Average price per head between 2 and 3 years old.	Average price per head over 3 years old.	Total number of mules compared with that of February, 1871.	Average price per head under 1 year old.	Average price per head between 1 and 2 years old.	Average price per head between 2 and 3 years old.	Average price per head over 3 years old.	Total number of milch cows compared with that of February, 1871.	Average price per head at this time.
Maine	95	$23 72	$36 81	$55 45	$96 36						83	$25 13
New Hampshire	96	27 16	46 66	64 50	98 83						93	33 33
Vermont	100	31 50	52 00	77 25	120 00						99	36 62
Massachusetts	102	36 62	63 75	88 00	135 00						101	39 87
Rhode Island	98	30 33	55 00	86 66	110 00						96	41 33
Connecticut	99	36 75	63 75	89 00	115 00						98	43 10
New York	101	40 59	67 41	94 58	130 58	99	$35 00	$60 90	$99 70	$138 13	101	39 53
New Jersey	101	52 30	82 30	116 53	148 57	101	58 00	88 00	124 87	167 72	102	54 80
Pennsylvania	101	40 53	66 58	96 13	126 65	99	49 00	80 00	120 88	149 00	100	39 16
Delaware	100	35 00	50 00	70 00	100 00	100	40 00	60 00	80 00	110 00	100	32 00
Maryland	101	42 91	67 33	94 16	114 16	100	51 00	71 25	116 00	137 90	101	32 25
Virginia	103	33 79	53 06	77 61	101 56	100	41 77	65 40	75 51	119 87	102	24 93
North Carolina	103	39 16	63 94	86 66	111 03	103	45 58	71 20	106 92	125 23	101	17 89
South Carolina	102	36 25	58 12	85 62	112 50	104	46 16	72 33	107 00	127 50	105	23 65
Georgia	102	38 70	61 41	87 36	113 29	103	45 67	70 88	105 80	130 00	103	20 81
Florida	104	37 50	67 27	96 36	120 00	106	50 33	75 00	110 00	135 00	101	14 03
Alabama	103	33 74	55 29	83 88	116 66	103	40 33	71 25	108 82	130 69	102	18 83
Mississippi	101	30 66	48 00	71 00	110 00	101	38 50	60 55	91 11	127 63	101	23 73
Louisiana	102	25 00	41 25	65 50	90 00	101	31 66	52 50	84 00	122 50	101	25 00
Texas	104	12 43	18 72	30 08	46 23	105	19 11	29 21	43 65	67 60	101	14 12
Arkansas	107	25 75	39 87	62 03	90 93	113	34 33	50 46	82 94	114 72	106	21 33
Tennessee	104	40 20	58 77	81 70	105 27	104	46 12	69 25	96 54	119 12	104	22 83
West Virginia	102	31 43	50 04	73 12	93 15	102	39 37	59 31	84 75	111 11	101	33 85
Kentucky	103	33 39	49 19	68 00	89 67	98	40 57	61 25	91 92	112 89	101	32 51
Ohio	102	33 42	51 82	76 86	102 28	101	37 78	61 57	87 76	115 09	101	37 36
Michigan	103	32 91	52 43	79 86	108 56	97	37 77	59 44	83 88	117 00	104	36 86
Indiana	102	28 41	44 29	62 77	88 42	99	33 92	53 39	77 03	102 04	102	33 57
Illinois	102	28 43	41 83	59 90	88 26	100	35 08	54 76	75 41	107 95	102	33 77
Wisconsin	106	31 32	51 92	71 32	100 88	105	34 54	50 45	72 27	108 80	105	29 29
Minnesota	110	33 09	53 30	79 83	108 32	109	36 76	55 88	79 11	119 56	110	29 70
Iowa	108	27 91	42 50	61 73	88 00	104	34 83	50 36	76 65	105 37	110	28 49
Missouri	106	25 17	38 46	53 80	74 15	105	33 64	50 50	70 95	95 80	106	25 85
Kansas	116	26 42	40 19	59 51	84 26	110	36 94	53 21	77 55	107 48	118	30 77
Nebraska	120	29 00	46 33	70 00	95 62	118	34 09	56 81	72 50	112 18	120	35 00
California	99	18 28	25 90	37 42	58 21	96	21 00	32 50	50 18	77 50	100	44 66
Oregon	107	22 90	32 00	48 13	67 72	103	21 66	31 66	46 50	69 44	107	37 90
Nevada and the Territories	114	21 21	35 08	47 94	70 80	115	27 15	41 53	60 89	111 50	115	34 12

Table showing the relative percentage, of numbers and prices of farm-stock, &c.—Continued.

STATES.	OXEN AND OTHER CATTLE.					SHEEP.			HOGS.		
	Total number of oxen and other cattle compared with that of February, 1871.	Average price per head under 1 year old.	Average price per head between 1 and 2 years old.	Average price per head between 2 and 3 years old.	Average price per head over 3 years old.	Total number of sheep compared with that of February, 1871.	Average price per head under 1 year old.	Average price per head over 1 year old.	Total number of hogs compared with that of February, 1871.	Average price per head under 1 year old.	Average price per head over 1 year old.
Maine	78	$7 40	$12 81	$20 22	$41 20	84	$2 47	$3 29	91	$8 32	$15 00
New Hampshire	88	10 00	18 50	30 33	53 33	94	2 50	3 08	92	9 50	18 25
Vermont	93	9 80	16 50	26 62	53 62	106	3 39	4 56	92	7 37	16 60
Massachusetts	98	9 37	18 25	29 62	54 75	93	2 28	3 92	95	9 68	18 37
Rhode Island	91	12 66	17 66	25 00	50 99	93	3 00	3 83	91	9 33	14 00
Connecticut	91	11 60	20 30	32 20	52 40	98	3 35	4 60	94	9 60	17 75
New York	99	11 44	21 00	33 67	50 70	99	3 13	4 32	103	5 63	12 50
New Jersey	102	15 50	24 92	37 33	54 03	96	4 52	5 27	110	7 35	16 60
Pennsylvania	95	10 53	19 46	32 50	47 41	95	2 54	3 70	105	4 93	11 92
Delaware	105	6 00	12 00	18 00	28 00	100	4 00	5 00	100	4 00	8 00
Maryland	101	9 00	14 25	21 75	32 75	94	3 37	4 37	99	4 04	8 35
Virginia	102	7 23	11 80	18 82	27 96	98	2 21	2 87	107	2 86	5 74
North Carolina	103	4 10	7 05	11 40	17 31	94	1 12	1 72	104	2 30	5 10
South Carolina	103	5 38	8 55	13 55	23 00	98	1 16	2 17	107	3 33	7 25
Georgia	98	4 55	7 51	11 13	16 15	96	1 14	1 66	107	2 71	5 47
Florida	96	3 45	5 22	8 72	13 75	95	1 16	1 93	103	2 03	4 30
Alabama	104	3 36	6 65	10 17	15 64	94	1 19	2 04	109	2 59	6 88
Mississippi	102	4 70	7 90	12 96	21 47	87	1 15	2 04	108	2 50	6 31
Louisiana	103	5 94	9 00	13 00	18 15	86	1 54	2 35	96	3 31	8 12
Texas	97	3 10	4 86	8 07	12 52	109	91	1 73	106	2 04	4 67
Arkansas	106	4 34	7 44	12 88	21 19	109	1 64	2 51	120	2 84	6 77
Tennessee	103	4 89	8 85	13 88	21 38	98	1 32	1 89	104	2 59	5 54
West Virginia	100	8 70	16 31	25 62	37 52	96	1 84	2 58	104	2 82	6 14
Kentucky	100	10 16	16 48	26 17	39 41	96	1 95	2 84	106	2 55	5 71
Ohio	100	10 67	18 81	29 70	45 16	98	2 36	3 37	102	3 93	9 07
Michigan	102	8 34	16 30	27 21	46 18	103	2 03	3 14	103	3 54	8 06
Indiana	100	8 34	15 22	25 02	36 53	93	1 90	2 76	106	2 98	6 79
Illinois	101	9 34	15 81	24 93	36 40	96	1 97	2 90	107	3 78	7 48
Wisconsin	108	9 10	15 84	24 76	42 38	104	2 01	2 88	100	3 51	7 14
Minnesota	110	7 53	14 40	23 56	38 46	104	1 78	2 90	115	4 04	8 64
Iowa	107	7 81	14 28	23 21	36 16	100	1 58	2 41	116	3 71	7 94
Missouri	105	6 76	12 24	19 68	29 72	92	1 48	2 14	115	2 18	4 78
Kansas	115	7 74	13 90	21 88	31 42	101	1 71	2 56	125	4 27	9 25
Nebraska	120	8 00	15 65	25 62	37 20	125	1 89	2 66	135	4 71	8 75
California	95	11 06	17 96	26 46	36 33	101	1 91	3 08	96	3 94	8 41
Oregon	107	12 95	19 72	29 40	39 36	116	1 72	2 70	106	3 02	6 10
Nevada and the Territories	125	8 81	15 29	26 01	38 29	115	2 19	3 54	119	7 95	14 89

EXTRACTS FROM CORRESPONDENCE.

The following extracts from regular correspondence may be taken as samples of memoranda, accompanying figures for tabulation:

Piscataquis County, Me.—A great reduction in numbers and prices of stock of all descriptions, resulting from the scarcity of hay.

Middlesex County, Mass.—The scarcity and high price of hay has reduced the number of neat stock. Hogs have also fallen off in number, on account of the low price of pork. Fancy horses have increased in numbers.

Berkshire County, Mass.—Horses number about the same as they did a year ago, but are cheaper. All horned animals have fallen in price; cows selling very low, from $25 to $65. Sheep and hogs have increased in numbers.

Kent County, R. I.—In consequence of the great scarcity of hay, all descriptions of stock have fallen off greatly in numbers, all passable beeves having been sent to the butcher last fall. Horses have also been greatly diminished in number.

Tolland County, Conn.—The short crop of hay has caused a diminution in numbers and prices of beef-stock.

Hartford County, Conn.—The milk demand has increased the number of milch cows, while oxen have fallen off in number.

Warren County, N. Y.—The scarcity of hay has compelled farmers to sell off their young cattle and sheep. Oxen and other cattle bring low prices.

Onondaga County, N. Y.—Cows have been low, but the price is advancing. Farmers incline to increase their sheep-flocks on account of prices of wool. More mules raised and used than ever before.

Genesee County, N. Y.—Milch cows have fallen off greatly in price; more sellers than buyers. Sheep have increased in value.

Camden County, N. J.—The short hay-crop has caused a diminution in prices of milch cows.

Armstrong County, Pa.—A scarcity of fodder has reduced the number of cattle. Hogs have been plenty and cheap, and are considered unprofitable in this season of scarcity. Horses have increased in numbers, but are somewhat cheaper on an average, though extra good ones are high, bringing $200.

Elk County, Pa.—Milch cows are much higher than usual, as many were killed in the fall for want of feed. Asking prices range as high as $55 to $60 for fresh cows.

Bradford County, Pa.—Prices of most kinds of stock have fallen off nearly one-half, during the past year, but cows and horses maintain a good price.

Prince George's County, Md.—The stock of hogs has been diminished, owing to the low price of pork.

Clarke County, Va.—Cattle number about the same as last year; there are more young animals, but few fat cattle, and very few are purchased to graze. Milch cows are more numerous and cheaper. Sheep have increased in number and in mutton quality; more have been bought to fatten than last year. Horses have increased about ten per cent. in number, but prices are lower.

Prince George County, Va.—Cattle have been reduced five per cent. in numbers by an epidemic which prevailed here last summer. The number of hogs has fallen off about twenty per cent. The number of sheep has more than doubled, and lambs sell readily at from $3 to $5. The lumber business has caused an increase of ten per cent. in the number of mules.

Orange County, Va.—This county is beginning to assume its former standing as a grazing district. All kinds of stock have slightly increased except sheep.

Powhatan County, Va.—Prices of cattle are low. Hogs have increased in number and quality, on account of the mast crop.

Stanly County, N. C.—Cattle are more numerous and their prices lower. The stock of sheep is diminishing every year, from neglect and ravages of dogs. Cholera has made much havoc among hogs, but the price of pork is low.

Harnett County, N. C.—Half of the sheep in this county have been destroyed during the past year by dogs and thieves.

Surry County, N. C.—An increase in the number of horses, mules, and cattle, and a decrease in prices. Sheep have decreased in numbers, owing to slaughter for food and destruction by dogs.

Washington County, Texas.—Pigs six months old sell for $10 each.

Fayette County, Texas.—Sheep rapidly disappearing westward.

Williamson County, Texas.—There is every spring a demand for ponies to drive stock with. The number thus driven has cut down the home stock 10 per cent. Mast-fed pork sells at 4 cents; corn-fed, 5 cents per pound.

Bexar County, Texas.—Merino ewes bring $5 in gold.

De Witt County, Texas.—Fifty per cent. of our cattle have died in two weeks, grass being scarce. Sheep, horses, and hogs doing well.

Putnam County, Tenn.—Planters south raising more stock, which cuts down our market.

Monroe County Tenn.—Horses and mules have increased, from the failing demand of the South. Some sheep sent to Virginia.

Knox County, Tenn.—Declining demand for stock has discouraged shipments. Hence all kinds are increasing in number.

Giles County, Tenn.—Wool worth 65 cents; more dogs than sheep here.

Larue County, Ky.—Mules are low-priced, because the choice animals have been shipped to market.

Butler County, Ky.—Price of wool has increased; large numbers of sheep sold, to be driven out of the county. Hogs have increased on account of the mast.

Lincoln County, Ky.—All the marketable mules have been bought up. Demand for cattle improved, but not so great as last year. Active demand for sheep for slaughter.

Adair County, Ky.—More grass and stock raised than under the slavery *régime*. This branch of industry increasing. Prices of stock are low.

Hardin County, Ky.—Beef-cattle, 4½ cents choice; fat hogs, 4 cents.

Medina County, Ohio.—Horses and cows not increased; sheep increasing, owing to increased demand for wool; hogs decreasing; pork selling in Cleveland at $5 per hundred-weight. Two fatal cases of *Trichina spiralis* in that city, and other cases not so serious, have made pork unpopular, and cut down prices 12 per cent. Demand for beef and mutton increasing. Cleveland is becoming a great market for farm products.

Henry County, Ohio.—Fat hogs weighing 200 to 400 pounds, bring $3 80 live weight, and $4 to $5 dressed.

Lorain County, Ohio.—Stock of cattle decreasing and sheep increasing, especially long-wooled sheep; sheep have done finely where well cared for; prospect of better prices of wool encourages better treatment. Scarcity of fodder has cut down the prices of cows. All kinds of farm stock healthy.

Morrow County, Ohio.—Demand for horses less than formerly; cattle lower in price, but rising; sheep higher than for several years, on account of advance in wool. Long-wooled sheep bring from $10 to $20; their number increasing.

Franklin County, Ohio.—Mules in demand for farm work; sheep scarce and high; horse breeds improving.

Montcalm County, Mich.—Hogs plenty; pork averaging $5 per hundred-weight, and beef, by the side, $5.

Cass County, Mich.—Sheep are the favorite stock, while hogs are disregarded.

Calhoun County, Mich.—Low prices of beef, pork, and dairy products have depressed cattle and hogs. Sheep have appreciated.

La Porte County, Ind.—Horses mostly small or medium sized, hence they do not bring good prices. Heavy draught-horses are in great demand at high prices. There is a small sprinkling of Durham blood in the cattle, which adds to their market value.

Martin County, Ind.—Sheep reduced in numbers by heavy sales to drovers, to be sent east and south.

Cass County, Ill.—Stock of horses gradually increasing, with diminution in prices. Abundant corn leads to feeding more cattle than last year; 5,000 beef cattle feeding in the county. Sheep scarce, on account of low prices of wool. Hog crop increased 25 per cent.

Williamson County, Ill.—Large number of sheep shipped for mutton, which, with the advance in wool, has doubled the prices of last year.

Bureau County, Ill.—Sheep raised in price, but less in number.

Fond du Lac County, Wis.—Sheltered stock looks extremely well.

Green County, Wis.—Only the best class of horses salable.

Pierce County, Wis.—Sheep rising in price; hog-raising will be less lively next year, through present low prices.

Dodge County, Minn.—Great increase of bees; number of swarms double of last year.

McLeod County, Minn.—Unexpected demand of the Hudson Bay Company, and the great fires, have reduced the stock of cattle.

Pocahontas County, Iowa.—Prices of all kinds of stock have fallen greatly in a year.

Marion County, Iowa.—Prices of horses, mules, and cattle but little more than nominal.

Linn County, Iowa.—All kinds of stock lower than for six years.

Jefferson County, Iowa.—Large numbers of stock cattle taken to Illinois. Hogs increased.

Harrison County, Iowa.—Horse stock improving; geldings bringing $200, and stallions as high as $2,000. But in many cases horses decline in price from overdriving.

Franklin County, Mo.—All sorts of live stock, except sheep, lower than ever known.

Phelps County, Mo.—Stock prices low; sheep decreased by ravages of dogs.

Vernon County, Mo.—Horses and mules increased 27 per cent. in numbers, and declined 30 per cent. in price. Cattle declined 9 per cent. in numbers, and 33 per cent. in price.

Perry County, Mo.—Low price of wool depressed the number of sheep, but it is enlarging.

Ellsworth County, Kansas.—Thousands of Texas cattle, driven into the county, have died.

Ripley County, Kansas.—Number of all kinds of stock increased, and prices decreased.

Nemaha County, Nebraska.—Sheep husbandry stimulated by advance in wool.

Seward County, Nebraska.—Large increase in numbers of stock on account of immigration.

Webster County, Nebraska.—Heavy losses among Texas cattle.

Washington County, Nebraska.—Oxen going out of use; cows and stock cattle increasing.

NATIONAL AGRICULTURAL CONVENTION.

The following call was issued by the Commissioner of Agriculture for a meeting of the representatives of scientific and practical agriculture of all sections of the country:

DEPARTMENT OF AGRICULTURE,
Washington, D. C., December 20, 1871.

SIR: By the act of the 2d July, 1862, Congress donated to the several States a portion of public lands, in the ratio of their population, for the purpose of establishing agricultural colleges, thereby evincing a purpose to promote that great interest, through the instrumentality of the respective States. Many colleges have been, and doubtless many more will be, established. State agricultural and horticultural societies and boards of agriculture have also been established by law in many States. A correspondence and consultation between friends of these interests have led to the conclusion that a convention of delegates representing them, for the purpose of conferring upon subjects of mutual interest, would promote the good of all. It has been suggested that I take the responsibility of initiating such a meeting. I therefore propose that each agricultural college, State agricultural society, State horticultural society, and State board of agriculture, depute two delegates to meet in convention at the city of Washington, on Thursday, the 15th of February next, to take such action regarding the interests of agriculture as they shall deem expedient.

I am, very respectfully,

FREDERICK WATTS,
Commissioner.

Responding to this call, delegates from agricultural colleges and State societies, agricultural and horticultural, met in convention in the library hall of the Department of Agriculture, on the morning of the 15th instant. Several district and county societies, and at least one town club, presented delegates, all of whom were ultimately received as members of the convention.

The Commissioner, in a brief opening address, welcomed the delegates, referred to the college land grant of 1862 as an earnest of the disposition of Congress to assist in promoting the interests of agriculture, and asked the co-operation of the bodies represented in the convention, in the work of the Department of Agriculture.

Professor J. B. Bowman, regent of Kentucky University, was made temporary chairman. A committee on organization, consisting of thirty-four members, was appointed, and the permanent officers of the convention were elected, as follows:

President.—Dr. George B. Loring, of Massachusetts.

Vice-Presidents.—Alabama, S. G. Reid; Arkansas, Thomas Smith; Connecticut, E. H. Hyde; Georgia, Hubert Fielder; Delaware, W. H. Purnell; Illinois, J. O. Cunningham; Indiana, Thomas Dowling; Iowa, E. R. Shankland; Kansas, Joseph Denison; Kentucky, J. B. Bowman; Maine, S. L. Goodale; Maryland, A. B. Davis; Massachusetts, W. S. Clark; Michigan, T. C. Abbott; Minnesota, W. S. King; Nebraska, D. H. Wheeler; New Hampshire, Natt Head; New Jersey, George F. Cook; New York, Ezra Cornell; North Carolina, N.W. Woodfin; Ohio,

J. P. Robison; Pennsylvania, H. N. McAllister; Rhode Island, Geo. F. Wilson; South Carolina, D. W. Aiken; Tennessee, Hunter Nicholson; Texas, Wm. J. Hutchins; Vermont, Crosby Miller; Virginia, Thomas Branch; West Virginia, A. Martin; Wisconsin, Hon. G. W. Hazleton; District of Columbia, Chalkley Gillingham; Department of Agriculture, Wm. Saunders; Utah, James McKnight.

Recording Secretary.—R. F. Johnstone, of Michigan.

Reading Secretary.—C. W. Murtfeldt, of Missouri.

Corresponding Secretary.—J. R. Dodge, Department of Agriculture.

The business committee, consisting of one from each State represented, made a preliminary report, recommending four topics for consideration, viz: 1. The expediency of seeking further land-grants from Congress in aid of industrial education; 2. The expediency of establishing experimental farms and stations; 3. The propriety of modifying the military instruction given in the national colleges of agriculture and mechanic arts; 4. The best methods of co-operating with one another and the Department of Agriculture.

A paper was presented by the Commissioner, suggesting action of the convention, as follows:

The act of July 2, 1862, is an earnest expression of Congress that a scientific education is essential for development of agricultural knowledge, and evinces the determined purpose of the Government, through the agency of State legislatures, to establish institutions of learning, where the youth of the country may be trained and properly fitted to elevate the standard of active, practical life, and secure for it the increased fruits of skillfully directed labor. It becomes those, therefore, who are directly interested in this subject, to take active measures to second the effort, and make use of the measures which have been adopted by Congress for their benefit. In the prosecution of this object, it is manifestly the duty of individuals interested in its promotion to examine the subject, and point out the detailed processes by which the design and bounty of Congress may be made most available.

This convention, composed of such as have taken an active part in the prosecution of agricultural study, has been convened to consider this. That the points which necessarily present themselves may be duly considered, we present the following resolutions:

Resolved, That it will greatly conduce to the successful operations of agriculture throughout the world, that its operators should have the light of scientific knowledge to guide the work.

Resolved, That we recognize in the act of Congress of July 2, 1862, the foundation upon which may be organized and built colleges and schools, where the scientific principles and knowledge of agriculture may be taught, and that it is our anxious desire and duty to foster and encourage them in the work of educating farmers.

Resolved, That in the establishment of agricultural colleges and schools, their organization should embrace the following principles:

1st. They should be distinctively agricultural in their government and teachings; that while no branch of learning shall be excluded, whether it be the knowledge of language, of mechanics, or military tactics, yet the main design shall be a knowledge of all those branches of natural and exact science and practical skill which peculiarly belong to a finished agricultural education.

2d. That in any such college or school, actual manual labor should be practiced and taught.

3d. That females, as well as males, may be admitted as pupils.

Resolved, That horticultural and agricultural societies, and agricultural

colleges and schools, are co-laborers in the same field, and tend to promote the same object—the proper cultivation of the soil; and that all these should unite on any plan of education by which the light of knowledge should be made to shine upon their work.

Resolved, That the Department of Agriculture is also a creature of the Government, established for the same great purpose of cherishing and promoting the interests of agriculture, and that its efficiency must necessarily depend upon its intimate connection with all other agricultural institutions which exist in this and foreign countries; and we therefore recommend to the said Department that it establish such a relation with the agricultural colleges and schools, and horticultural and agricultural societies, as that there may be a continuous exchange of information, seeds, roots, plants, and publications as shall be mutually advantageous, and conduce to the leading agricultural and horticultural interests of the country.

These resolutions were adopted by the convention.

Upon the first topic of regular business, relative to further aid to agricultural colleges and schools, Mr. Folwell, president of the Minnesota University, illustrated the injustice of the distribution of lands, deprecating the departure from the precedent of apportionment by territory rather than by population. Mr. Gregory, regent of the Illinois University, deemed unjust an apportionment of land to States having public lands, and scrip to those having none, and favored a new apportionment to common, normal, and high schools, and agricultural and other colleges, as follows:

1st. One-third of the fund, or the income of, to be apportioned to the States on the basis of the number of children between the ages of six and fifteen years, to be used in the payment of teachers' wages or the purchase of school libraries, on such plan as each State may determine.

2d. One-third to be apportioned to the several States on the same basis as before, to be used in support of normal schools and of normal classes in high schools, in such way as the several State legislatures may determine: *Provided*, that at least one-half of such fund shall be apportioned to the several schools in the proportion of the number of the normal pupils who shall complete the normal course and pass the examinations prescribed by the superintendent of public instruction or other proper State authorities; and,

3d. The remaining third to be apportioned to the several States as follows: One-half on the basis of the population of such States, and one-half on the basis of area of the States, to be used in support of the agricultural, polytechnic, and other State colleges and universities, in such way as the several States may determine.

These propositions, after discussion, were referred to a committee of five members, and made the special order for the opening hour of the second day.

On motion, the following special committees were appointed by the chair:

Equalization of land-grants.—Folwell, Minnesota; Bowman, Kentucky; Gilman, Connecticut; Abbott, Michigan; Fielder, Georgia.

Military education.—Gregory, Illinois; Clark, Massachusetts; Clark, Vermont; Alvord, Virginia; Klippart, Ohio; Welch, Iowa.

Experimental stations.—Nicholson, Tennessee; Needham, Massachusetts; Hamilton, Pennsylvania; Johnston, Connecticut; Allen, New York.

Co-operation with the Department of Agriculture.—Barnett, Georgia;

Curtis, District of Columbia; Smith, Vermont; Reynolds, Illinois; Robison, Ohio.

On the morning of the 16th, the business committee, through Commissioner Watts, reported a recommendation: 1. For the appointment of a committee of five upon the best methods of preserving the timber of the country, especially of the Rocky Mountains and the central prairie regions of the republic; 2. That boards of agriculture be established in all States in which they do not already exist; 3. That a committee of five be appointed to visit Congress and request an increase of appropriations for the distribution of publications and seeds by the Department of Agriculture. The report was adopted.

The committee on the equalization of land grants reported resolutions to remedy both the inequality and insufficiency of the grant of 1862, by an additional distribution of not less than one million acres to each State, to be selected and located at the pleasure of the grantees. After a very full and general discussion, and presentation of numerous amendments, the substitute of Mr. Gregory, of Illinois, was adopted, recommending to Congress the bestowal of an additional grant of land, or proceeds of land, upon all colleges established or to be established under the grant of 1862, and the appointment of a committee of one from each State to urge this proposition upon the attention of Congress.

The committee upon co-operation with the Department of Agriculture made a report, closing with the following recommendations:

1. That the several societies and colleges have some specific organ of communication with the Department of Agriculture, the person, time, and topics known, and that the Department prescribe the topics, with appropriate printed inquiries.

2. That an annual convention, like the present, be held, in which representatives from the several State societies, and other societies covering a larger or smaller area, and the agricultural colleges, may be represented on some proper basis.

3. That the Department tabulate the information thus obtained, and distribute it among the several lesser organizations. Among the subjects to be presented shall be the briefs of all the organizations of States and other large district societies, with such revision and suggestions as may aid in determining the best mode of organization.

4. That the several State societies co-operate fully with the Department in obtaining statistics of every sort—especially of growing crops—and make suggestions as to improved methods of estimating them; also, in such observations upon the weather as may greatly increase the data for determining the local varieties of the seasons. The degree of success already attending the observations made, give encouragement to this direction of inquiry—to be made in detail, to determine the local laws, and for larger periods, to anticipate the probable state of the season, and possibly to influence them to some extent, or at least better to conform to them.

5. The Department shall consider the entire field of investigation, and assign to the several State societies appropriate subjects of observation, and also subjects for scientific investigation by the agricultural colleges and professors.

6. It shall collate information as to the practical working of different forms of minor organizations, less than State societies, so as to exhibit the best and most approved form of clubs for the immediate information and education of the farmer at his work, making them schools for the ear and eye alike.

7. Prior to the assembling of the national convention, specific sub-

jects of consideration shall be prescribed, and persons of high qualifications appointed to open the discussions.

8. That for each duty a specific organ, whether of the Department or the societies, shall be provided, either by the appointment of an individual or a committee. Thorough elaboration of information, and proper digestion of matter for publication, shall, if possible, be the duty of some officer of the Department.

9. That among the subjects for reports at the next convention held, according to the first resolution, be the following:

First. On the importance and means of improving physical expertness in agricultural labor, the object being to devote to the development of human skill the attention too much confined to the horse and the brute creation, and a report to be presented concerning expertness in farm-labor.

Second. On the importance to farmers of accurate accounts of expenses, receipts in detail, and of careful study of these, as a means of constant annual improvement.

Third. On the best means of organizing neighborhood associations for mutual improvement.

Fourth. On the best method of conducting experiments, and the necessity of careful records, and of separating the conditions involved.

10. That copies of this report be communicated to the several State societies and agricultural colleges of the United States, and they be requested to communicate their action in regard to the proposed relations to the National Department of Agriculture, and of the persons appointed as organs of communication.

This report was accepted, and referred to the Department of Agriculture.

A resolution, presented by Senator Morrill, of Vermont, favoring a donation of land, or the proceeds of land, sufficient to found a professorship of one of the branches of practical science in the land-grant colleges, and the assignment to each, by the War Department, of an officer of the Army competent to give mathematical and military instruction, was adopted.

General N. N. Halstead, of New Jersey, offered a resolution recommending a provision by State and county agricultural societies, for a scholarship in agricultural colleges for each county, and also a provision on the part of agricultural colleges, requiring a satisfactory examination of students by a committee of practical farmers, before a diploma can be given, which was also adopted.

A resolution offered by Mr. J. N. Sturtevant, of Massachusetts, commending the plan of the agricultural and economic museum of the Department to the agricultural colleges of the country, was adopted. Also, one presented by Professor C. V. Riley, of Missouri, asking an appropriation to enable the Department of Agriculture to publish the illustrated work of its entomologist, Townend Glover, on insects; and an annual appropriation of not less than $10,000 for defraying the cost of experiments in the destruction of noxious insects, to be made by the different State boards throughout the country.

Prof. Hunter Nicholson, of Tennessee, chairman of the committee on experimental stations, reported a resolution instructing Professor S. W. Johnston, of Yale College, to make an investigation of the workings of experimental stations in Europe, and report further upon their character and value, and the practicability of their establishment in this country, as an aid to scientific agriculture. Adopted.

A resolution was adopted recommending the increase of the salary of

the Commissioner of Agriculture from $3,000 to $6,000, and one favoring an increase of the salaries of the statistician, entomologist, and superintendent of gardens and grounds, from $2,000 to $4,000 respectively.

The following views of the results of the convention are presented by the Commissioner of Agriculture:

The late convention, convened at the instance of the Commissioner of Agriculture, has afforded an ample opportunity to the Department to accomplish the object it had in view—a knowledge of the men who, for the present, have in their hands and direct the destinies of the agricultural interests of the country, and some knowledge of the instrumentalities through the medium of which they operate. The assemblage was mainly made up of the principals and professors of agricultural colleges, whose origin may be traced to the act of Congress which made provision for their establishment; presidents and secretaries of agricultural and horticultural societies, and the chief men who compose boards of agriculture of the different States. It was reasonably supposed that the experience and knowledge of such an assemblage of men would shed much light upon a subject which, at this moment, so occupies the public mind. While every branch of industry, commerce, manufactures, and the art of war itself, is anxiously watched and cared for by the action of the Government, it was very natural that they who have sought to promote the great cause of agriculture should seek an opportunity to confer together about what should be done to invoke the good offices of the Government in their behalf. The Commissioner of Agriculture, in view of the necessity of a co-operation of the Department with those active and energetic men who in their respective communities had been selected for their ability, to give a right direction to the subject, very naturally hit upon the idea that agricultural colleges that owed their existence to the immediate provision which Congress has made for them, like his own Department, depending upon its will and pleasure, would be most likely to respond to an invitation which invoked only a consultation upon a subject of common concern. It was not without some hesitation that the Commissioner ventured to draw upon the services of this class of men, because he felt that the draught involved an expenditure of time and money, which, though it might be repaid by the good which would result from such a conference, might be considered by others an assumption on his part which the occasion did not justify; and yet to exclude those who had thus voluntarily devoted themselves to the work of promoting the cause of agriculture, to lose the benefit of their counsel, and the opportunity to acquire a personal acquaintance of them, led to the conclusion to enlarge the number, at the risk of affecting the business capacity of the convention by reason of its numbers; so that the design ultimately was to invite two delegates from each of the colleges and State agricultural and horticultural societies, and State boards of agriculture. All these came and more, and before the convention adjourned no one was refused admission who pleased to apply. And every interest, feeling, and project was represented.

The business committee, (composed of one from each State,) at the outset of the meeting, made a report, which had been previously prepared by the Commissioner, recognizing the act of Congress of 1862 as the expression of the purpose of the Government to establish agricultural colleges in the States, and endow them with a fund commensurate with the great necessity for the introduction of scientific knowledge into the

practical operations of agriculture, and recommending an immediate connection and correspondence between the Department and these institutions, on all subjects pertaining to experiments in the science and practice of agriculture, and pointing out some points of the basis upon which they should be made to stand. This was all a committee, composed of so many members, could do, and this action was unanimously adopted by the convention. All else, the work of the convention, had its origin in resolutions proposed by its individual members, which were as various as the different projects which were calculated to affect agricultural interests. The disposition of the public lands, how they should be best appropriated to promote the success of the colleges and of education generally, was discussed in all its phases; the threatened destruction of forests, how they might be preserved and increased, claimed the attention of the convention as a subject of important interest, and the action of Congress was strongly invoked to pass such laws as would induce purchasers and owners of public lands to protect the timber yet in forest, and plant upon the prairies, where now there is no timber.

The whole doings of the convention made the impression that the conference had been a profitable one; that it had linked the Department with the agricultural institutions of the country; that each might profit by the aid of the other, and that both would act in harmony to promote the common good.

FORESTS AND THE PUBLIC LANDS.

The following views on the conservation of forests of the public lands, and on the proper basis of land-grants for educational purposes, are those personally entertained and presented by the Commissioner of Agriculture:

The public lands and the disposition which shall be made of them by the Government of the United States is a subject of such magnitude and importance, and so nearly allied to those agricultural interests of the country which this Department has in charge, that the duty devolves upon me to observe and carefully scan any movement with regard to them which has a tendency to disturb or promote the ultimate progress and improvement in the cultivation of the soil.

The destruction of the forests of the country, which is now going on with so fearful rapidity, should arrest the attention of Congress long enough to institute the inquiry, What can be done to prevent so great a calamity as that which now threatens us?—the want of a sufficient quantity of timber to meet the actual necessities of life, and, what is of equal importance, the climatic influence which will be occasioned by denuding the earth of its timber, and plants of the shelter and protection which it affords. It is not my purpose to stop here and inquire into the philosophy of the causes of water-fall; nor how the electrical rain-bearing clouds are dissipated before their watery elements can reach the earth. These are points which I prefer to leave to scientists, and which, happily, I think, they have not overlooked, but, on the contrary, have brought much learning to bear upon them, which may ripen into conclusions which will be received as practical truths. It is enough for us now to know the palpable facts that our springs of water, and the streams that issue from them, are greatly diminishing in volume; that our wells have not the depth of water they formerly had; that our crops suffer

for want of rain to an extent that was not so common in olden times; and we do know that where these changes have occurred, the country has been stripped of its timber, and its fountains, springs, and streams laid bare to the broiling sun and unbroken winds. These facts, put together, exhibit a practical cause and effect with an apparent force of truth which should command our attention, and induce the inquiry whether the Government may not interpose its power and influence to protect the timber-lands of the country. There are yet thousands of millions of acres of public lands undisposed of, and, as to them, I beg leave to suggest that, from this time forth, no disposition shall be made of them for any purpose or for any consideration, pecuniary or otherwise, without a provision imposing a condition, to be inserted in the warrant or patent, as the case may be, that the grantee shall keep at least ten per cent. of the lands so granted in timber, if there be so much, and, if not, that he shall be allowed a credit of twenty per cent. of his purchase-money as an inducement to plant so much of his land in timber; and to insure the performance of the condition, a failure on the part of the purchaser should work a forfeiture of his title. Let us imagine the millions of acres of Government lands yet to be surveyed and disposed of in sections of six hundred and forty acres, and these divided into one hundred and sixty acre farms, and each having sixteen acres of woodland so disposed as to afford a shelter to the orchards and growing crops, and the whole system working its wonderful influence upon the streams, the climate, and everything that grows upon the earth.

While I look at this subject only in an agricultural point of view, there is another in which the nation should look upon it as extremely important—the annual consumption.

The dwellings of twenty millions of people here are chiefly made of wood; the out-buildings are almost entirely built of wood; the fencing, which costs actually more than all the buildings, is of wood; and all these are being continually consumed by time. Railroads consume timber immensely. It has been estimated that each day in the year trains run about three hundred and twenty thousand miles, consuming one and a half cords of wood for every twenty-five miles, making a daily consumption of nineteen thousand two hundred cords. Sixty thousand miles of road require two thousand five hundred ties to the mile; and assuming their life to be five years, an annual consumption of thirty millions of ties is required; and it may be safely said that the waste in getting out ties is one-third of the tree. Add to this the fencing of these roads, the half million of telegraph-poles which each year will be required, and the vast amount of destruction of forests by flood and fire, and we must be startled into the conviction that we must not only make an effort to stay the hand of ruthless destruction, but we must make an effort to restore that which has already been destroyed. Where land sold by the Government has no timber upon it, I would not only abate the purchase-money to induce planting timber, but I would exonerate the land from the payment of taxes for a certain number of years. Doubtless, there is no State or Territory which would not gladly co-operate with the General Government in any measure which conduces to so much good.

Would the insertion of this proposed condition impede the sale or retard the settlement of the public lands? In other words, would it be objectionable in the view of the settler or purchaser? It can scarcely be supposed that any one inclined to make a home in a new country would fail to foresee the immense advantages that would accrue to an entire community of farmers by the protection which would be afforded to

their orchards, crops, and buildings, especially if they be assured by the law which controls the titles of all that it is a fixed principle, by which all must be governed. Apart from the considerations of interest involved in these suggestions, how much would such a state of things add to the beauty and character of a State? The idea that one-tenth of its lands was covered with growing and thriving timber, producing every year an amount equal to all the wants of its owners, and yet not diminishing in area, would give an eclat to a whole State in which such a system prevailed, and add immensely to the value of its estates. Lands thus kept in timber are not lost to the productive industry of the country, for, if properly cared for, there are certain grasses which grow profusely in the woods, and afford an amount and quality of pasturage which would be quite as profitable as any other part of the farm. In every point of view in which this subject may be looked at, it presents the strongest reasons why this most vital interest of the country should be guarded through the instrumentality of the power of Congress when disposing of the public lands. It should be a stipulated condition of all grants that ten per cent. of the land granted should be kept in timber.

There is one other subject, which pertains to the disposition of the public lands, to which attention should be attracted. By the act of Congress of July 2, 1862, there was donated to the States about ten millions of acres of the public lands, and the principle of distribution was to each State in proportion to its representation in Congress—30,000 acres for each Senator and Representative—whereby Minnesota was entitled to 120,000 acres, whereas New York was entitled to 990,000 acres, the latter having an area of about thirty-two millions of acres, while that of Minnesota is about fifty millions. This basis of *pro rata* works such manifest injustice, whatever may be the object of the grant, that it should never again be allowed to control that just equality which is always sought to characterize the action of the Government. Its injustice is made the more manifest by the consideration of the facts that in 1850 the cultivated area of Minnesota did not exceed two thousand acres, whereas in 1868 it was about one million three hundred and eighty thousand acres; and what was unjust in 1862, when the law was passed, has already become more than doubly so in 1872, because of its increased and continually increasing population. This comparison is used as an illustration of what is equally true of all the Western States and Territories.

It is not an easy subject to say what would be a proper basis of *pro rata* division, such as would reconcile itself to our sense of justice. Area of territory naturally suggests itself. But this, too, would manifestly work inequality and injustice, for many reasons which readily present themselves. All legislation is for the common benefit. It is to do the greatest good to the greatest *number*, and not to the greatest *part*. And while the time may come when Minnesota may equal or double the population of New York, that time is yet very distant, and time is an element which should occupy a prominent place in any investigation of such a subject. Again, in some of our States and Territories there are large areas which are not susceptible of either population or cultivation to any great extent. In such cases, to measure a division upon such a basis, would be without the sanction of any principle of right. It is much easier to tear down than to build any structure; but naturally striving to give to each of these conflicting elements their due weight, a compromise between them suggests itself. In the councils of the nation territory is comparatively silent and weak, while population is loud and

strong, but apparently ever ready to enact laws according to equity and justice. I suggest that both these principles of territory and population shall be invoked in the solution of this question, and that when our lands are to be divided between the States *pro rata*, the basis of it shall be both population and territory; that one-half shall be *pro rata* according to population or representation, and the other half according to area of territory. This may not, in all possible cases, produce exact justice and right, but it will approximate it as nearly as human law can attain any object.

FARM RECORDS.

Few systematic records of yield and value of farm crops, or of the results of peculiar culture or variable seasons, have been published in this country. Mr. John N. Nelson, of Newark, Rock County, Wisconsin, has communicated certain results of his farm-work for twenty-two years, showing the product and price of corn and wheat, beef and pork, for that period.

Wheat produced and sold in twenty-two years.

Year.	Acres.	Bushels.	Value realized.	Remarks.
1850	25	359	$286 25	Kind, Hedge-row; beardy and good.
1851	28	128	79 25	Kind, Hedge-row; badly blighted; wet summer.
1852	12	169	90 38	Kind, Canada Club; good.
1853	10	57	29 68	Kind, Canada Club; partly destroyed by chinch-bug.
1854	12	36	29 20	Kind, Canada Club; destroyed by chinch-bug.
1855	24	215	224 00	Kind, Canada Club; good; bugs again.
1856	50	589	504 30	Kind, Canada Club; good, but light crop.
1857	25	39	39 00	Kind, Canada Club; destroyed by chinch-bug.
1858	44	965	610 50	Kind, Canada Club and Rio Grande; good.
1859	20	183	189 24	Blighted badly; wet summer.
1860	50	989	788 00	Kind, Rio Grande; good.
1861	35	663	474 33	Kind, Fife and Rio Grande; good.
1862	40	793	531 10	Do.
1863	25	105	81 10	Kind, Fife and Rio Grande; destroyed by bugs.
1864	30	282	339 00	Kind, Fife and Club; damaged by bugs.
1865	29	.....	.....	Bugs took all the crop.
1866	35	234	284 40	Kind, Fife and Rio Grande; badly damaged by bugs.
1867	30	179	395 75	Kind, Fife and Rio Grande; blighted.
1868	30	506	844 86	Kind, Fife and Rio Grande; good.
1869	28	.....	.....	Bugs took all the crop.
1870	25	248	313 50	Kind, Sangapore or Mammoth; good.
1871	20	184	202 40	Kind, Sangapore; dry season; quality good.
	627	6,923	6,336 24	Total amount sold.
		880	812 00	Amount used in family.
		1,096	1,040 20	Amount used for seed.
Total	.....	8,899	8,188 44	

Corn sold in twenty-two years.

Year.	Acres.	Bushels.	Value.	Remarks.
1850	20	8	$2 60	Kind, Hackberry and Dent.
1851	25	90	30 00	Kind, Hackberry and Dent; good.
1852	30	27	6 50	Do.
1853	15	103	44 40	Do.
1854	25	432	178 10	Do.
1855	27	449	208 90	Do.
1856	30	606	286 00	Do.
1857	37	1,300	568 50	Do.
1858	35	590	157 70	Light crop; dry season.
1859	40	1,000	744 00	Extra good.
1860	40	475	132 20	Good.
1861	36	250	165 50	Part destroyed by chinch-bugs.
1862	40	2,371	1,986 10	Good.
1863	35	851	371 37	Do.
1864	60	1,448	1,538 90	Damaged by chinch-bugs.
1865	37	516	258 11	Good.
1866	40	715	321 34	Do.
1867	30	229	160 00	Do.
1868	40	614	496 00	Do.
1869	45	949	611 25	Do.
1870	50	830	548 00	Dry season; crop light; quality good.
1871	48	791	407 31	Dry season; quality good.
	779	14,644	9,222 78	Total amount sold.
		1,200	480 00	Amount on hand and present value of, at 40 cts. per bushel.
Total ..		15,844	9,702 78	

Beef sold.

Year.	Pounds.	Value.	Remarks
1850	6,000	$315 00	Fed corn on cob.
1851	4,046	300 10	Do.
1852	6,000	250 00	Fed 386 bushels corn-meal.
1853	1,000	40 00	Fed corn-meal.
1854	2,000	140 00	Fed cob and corn, ground.
1855	3,600	261 00	Do.
1856			
1857			
1858			
1859	1,860	163 00	Fed cob and corn, ground.
1860	1,200	60 00	Do.
1861	615	40 00	Do.
1862	1,500	81 00	Fed corn-meal.
1863			
1864	138	10 67	Do.
1865	1,200	90 00	Fed cob and corn, ground.
1866	1,800	119 32	Do.
1867	1,700	130 00	Do.
1868	246	13 75	Do.
1869			All the cattle sold alive on the scales, except three or four.
1870			Do.
1871	2,010	85 25	Had single quarters dressed.
Total	34,915	2,099 09	

Of the fat cattle, Mr. Nelson says: "I sold 56 head of fat cattle altogether. In 1852 I ground the corn and fed 386 bushels of meal to 10 head, about 38 bushels each; and I think that would prove a correct basis for averaging the remainder. These 56 head cost $657 12, or $11 77$\frac{6}{10}$ each; sold for $2,099 09; average, $37 48. Cattle mostly two years old, bought in the fall and sold in the spring following."

Pork sold.

Year.	Pounds.	Value.	Remarks.
1850	1,161	$45 00	Fed corn exclusively.
1851			
1852	3,760	222 00	Fed corn exclusively.
1853	2,713	95 81	Do.
1854	3,497	165 85	Do.
1855			
1856			
1857	505	27 77	Do.
1858			
1859	2,011	86 86	Do.
1860	1,075	33 81	Do.
1861	3,989	171 80	Do.
1862	981	88 00	Do.
1863	1,000	124 80	Do.
1864	1,279	86 51	Part meal and cooked.
1865	3,616	183 00	Do.
1866	1,736	188 00	Do.
1867	2,985	285 24	Do.
1868	2,720	235 00	Do.
1869	6,528	214 40	Part meal and pumpkins, cooked.
	39,556	2,253 85	Pork averaged 5 cents per pound.
	13,200	660 00	Used in family in twenty-two years.
	52,756	2,913 85	
		300 00	Value of hogs on hand.
Total		3,213 85	

Wheat account condensed.

Cost of plowing, sowing, dragging, and rolling 627 acres, at $2 per acre	$1,254 00
1,096 bushels seed-wheat, at 95 cents per bushel	1,041 20
Cutting, binding, setting up, drawing, stacking, thrashing, and boarding, $2 89 per acre	1,812 03
Rent of land, at $2 50 per acre	1,567 50
Cost, ($9 05 per acre)	5,674 73

Receipts from wheat.

6,923 bushels sold; average (about) 92 cents per bushel	$6,336 24
880 bushels used in family, at 92 cents per bushel	809 60
Total receipts	7,145 84
Cost	5,674 73
Profit, ($2 34 per acre)	1,471 11

Corn account condensed.

Cost of plowing, dragging, rolling, and planting 779 acres, at $2 per acre	$1,558 00
Cultivating and harvesting, at about $3 73 per acre	2,912 19
100 bushels of seed sown	100 00
Rent of land, at about $2 50 per acre	1,947 50
Cost, (per acre, about $8 36)	6,517 69

Receipts from corn.

2,200 bushels fed to horses in twenty-two years, at 61 cents per bushel	$1,342 00
100 bushels fed to sheep, in 1867 and 1868	61 00
880 bushels fed to cows and young stock in twenty-two years	536 80
Difference in value of cattle, between buying and selling	1,441 99
15,844 bushels sold and on hand	9,702 78
52,756 pounds of pork sold and used in family	2,913 85
40 hogs on hand, valued at	300 00
2,083 dozen eggs, $224 95; 625 chickens, $145 47	370 42
	16,668 84
Profit, (about $13 03 per acre)	10,151 15

These records make the average yield of wheat for the period of twenty-two years, 14.15 bushels per acre; the receipts, exclusive of seed, $11 39 per acre; cost of cultivation, $9 05; and net profit per acre, $2 34. The losses from insects are heavy, partial in seven seasons, and total in the years 1865 and 1869. In 1855 the yield was 9 bushels per acre; in 1854, when insects were peculiarly destructive, it was only 3 bushels; and in 1857, little more than 1½ bushels. In five seasons of the twenty-two reported, the average yield was less than 5 bushels. The result is not indicative of much profit in wheat-growing. It is evident that the avoidance of one-half of the losses by chinch-bugs would have doubled the profit actually obtained.

The record is imperfect, in failing to give the quantity of corn fed to hogs, in addition to 15,844 bushels sold, 2,200 fed to horses, 880 to cows, and 100 to sheep, and also in including the profits of feeding, for beef or pork, in the net profits of corn culture. This method of statement makes the gross receipts for corn $21 39 per acre; cost of culture, $8 36; net profit, $13 03 per acre, which is $1 64 per acre more than the gross product per acre of wheat. Mr. Nelson thus finds that, if the 627 acres of wheat had been planted in corn, with similar results, yielding a net return of $13 03, instead of $2 34, the difference in his favor would have been $6,702 63.

A PENNSYLVANIA FARM.—Mr. Johnson Miller, of Warwick, statistical correspondent of this Department for Lancaster County, Pennsylvania, at a late meeting of the Agricultural and Horticultural Society, read an instructive essay upon farm accounts, from which the following statistics are taken, as representing the operations of a farm of 100 acres, belonging to his father:

Years.	INCOME OF GRAIN SOLD IN SIX YEARS.					INCOME AND EXPENSES OF LIVE STOCK.		
	Wheat.	Corn.	Oats.	Rye.	Total.	Income.	Expenses.	Balance.
1864	$964 80	$542 62	$214 30	$34 50	$1,756 22	$874 60	$525 00	$349 60
1865	314 44	337 25	111 50	11 44	774 63	877 35	495 00	382 35
1866	232 80	524 00	255 21	21 75	1,034 36	755 20	525 50	229 70
1867	1,244 89	435 79	196 12	24 29	1,901 09	970 18	823 22	146 96
1868	478 20	309 29	99 27	19 56	906 32	942 70	460 79	481 91
1869	517 47	659 59	164 50	16 10	1,357 66	.....	.....	.....
Total	3,752 60	2,809 14	1,040 90	127 64	7,730 28	4,420 03	2,829 51	1,590 52

Years.	MISCELLANEOUS INCOME.				ANNUAL EXPENDITURES.		
	Butter and eggs.	Hay.	Pasture.	Miscellaneous.	Farming.	Household.	Farm-hands.
1864	$217 71	$50 00	$28 50	$256 78	$381 97	$392 85	$241 03
1865	237 77	53 00	18 75	73 22	638 06	203 65	222 99
1866	211 14	104 74	17 00	37 50	600 99	434 79	227 51
1867	209 34	66 60	10 68	116 20	863 03	396 54	313 52
1868	236 71	47 92	9 00	7 73	314 95	657 69	267 52
1869	217 03	68 00	.....	91 54	358 78	447 13	309 07
Total	1,329 60	390 26	83 93	587 97	3,157 77	2,532 65	1,581 64

The annual crops for twenty years were as follows:

Years.	Wheat.	Corn.	Oats.	Rye.	Total.	Years.	Wheat.	Corn.	Oats.	Rye.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*		*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1850.....	446	990	402	47	1,885	1861....	483	875	743	30	2,131
1851.....	652	485	700	21	1,858	1862....	610	900	567	25	2,102
1852.....	342	1,100	591	11	1,944	1863....	483	1,260	482	20	2,245
1853.....	423	1,000	310	24	1,757	1864....	432	945	743	24	2,144
1854.....	526	975	690	86	2,277	1865....	274	1,100	509	20	1,903
1855.....	482	1,240	710	40	2,472	1866....	301	1,325	585	24	2,232
1856.....	560	704	495	42	1,801	1867....	432	1,200	579	16	2,227
1857.....	663	875	677	55	2,270	1868....	312	1,075	450	14	1,851
1858.....	732	725	433	25	1,915	1869....	747	900	654	28	2,329
1859.....	785	680	574	30	2,069						
1860.....	570	722	703	25	2,020	Total.	10,255	19,076	11,597	607	41,535

The above statement shows the total number of bushels of grain raised in the last twenty years on this model farm—10,225 bushels wheat; 19,076 bushels corn; 11,597 bushels oats; and 607 bushels rye; making a total of 41,535 bushels of grain, or an average of 2,077 bushels per year; or, by taking the average of each crop, we have 513 bushels of wheat, 954 bushels of corn, 580 bushels of oats, and 30 bushels of rye per annum.

The income from cereals during six years was $7,730 28; from live stock, $1,590 52; from butter, eggs, hay, pasture, &c., $2,391 76; total income, $11,712 26. The expenses during the same time were, farming expenses, $3,157 77; household expenses, $2,532 65; farm-hands, $1,590 52; taxes, $944 33; total expenses, $8,216 99. The net income was $2,495 57, averaging $415 93 per annum, in addition to the products consumed by the family.

NOTES OF THE GARDEN.

BY WILLIAM SAUNDERS, SUPERINTENDENT.

GROWING THE TEA-PLANT FROM SEEDS.—Inquiries having reached the Department concerning the best mode of raising plants of the Chinese tea from seeds, it is recommended to sow them in boxes filled with light soil, covering the seeds with a depth of half an inch of the same. A sash-covered frame will afford the most favorable conditions of growth; but where this convenience is not available, the boxes may be placed in a sheltered and somewhat shaded position, in the open air, and the soil maintained in a damp although not wet state. After one year's growth they may be transplanted to permanent locations.

LICORICE-ROOT CULTIVATION.—Hon. William D. Kelley, of the House of Representatives, has referred to the Department a statement of Messrs. Mellor & Rittenhouse, of Philadelphia, concerning the manufacture of licorice, the extent of its consumption in the United States, and the practicability of cultivating the root in this country.

The larger proportion of licorice-extracts consumed in the United States is by the manufacturers of chewing-tobacco, it being considered indispensable in "plugs" or "limps." In medicine it is largely used as an expectorant. The following figures of the Bureau of Statistics show

the quantity and value of licorice-extract imported during the last five years:

Year.	Quantity.	Value.
1867.....pounds..	3,695,976	$450,910 29
1868.....do....	3,865,257	469,045 75
1869.....do....	2,936,999	379,012 80
1870.....do....	2,759,668	351,851 00
1871.....do....	2,665,536	310,901 00

In England an acre of the cultivated root is said, by the firm referred to, to command £100. The root is also imported by the United States from Spain, Italy, Sicily, France, and Russia, but chiefly from the two first named.

Entertaining the opinion, after some investigation, that the root can be successfully cultivated in several of the Southern and Western States, Messrs. Mellor & Rittenhouse consider that a new industry may be fostered, relieving us of the necessity of importing a valuable and indispensable product. The root is worth from five to ten cents per pound, according to quality, and three pounds will yield one pound of the extract. In addition to the yield of extract, the crushed and powdered root is applied to various minor uses. Messrs. Mellor & Rittenhouse attribute the decreasing importations in the statement above made from the Bureau of Statistics, to the high tax on plug-tobacco, in which the extract is used, and a discrimination in favor of fine-cut chewing, the tax on which is about one-half that on plug-tobacco.

The following considerations upon the subject of introducing the culture of the root into this country were submitted by the Commissioner:

I am not aware that this root has ever been a successful culture here—not by any means on account of uncongenial climates. As far as climate is concerned, it can be produced from New Jersey south and westward; but, like many other products equally well suited to our climates, such as tea, madder, opium, indigo, &c., &c., its profitable culture depends upon the price of labor. This does not apply, perhaps, in the same degree either to licorice, madder, or indigo, as it does to tea and opium, because more of what may be classed as unskilled labor is needed for the two last-named products.

Practically, the soil to produce good licorice-roots must be rich, and, above all, deeply worked—say from eighteen inches to two feet—of a light, loosened, rich soil, a preparation that is best attained by hand-labor. Then, again, the crop takes from three to four years to perfect, so that the estimate of its value at £100 per acre, (which, by the way, is a very high estimate,) has to be divided by 4 to give the yearly value of an acre of the root. I do not suppose that farmers would consider it a profitable crop unless they received double the amount per pound for it that it is now imported for. The same species of labor expended upon vegetable-growing realizes ten times the value of product, so that there is but little to encourage the farmer to enter this branch of culture. There are at least $50,000,000 in gold that yearly go to other countries for products that can be produced here in equal perfection, as far as climate and soil are concerned, but we cannot compete with their cheap labor.

CINCHONA.—In the year 1870 the American Medical Association memorialized Congress on the importance of introducing the cultivation of the cinchona tree into the United States. The memorial sets forth at some length the value of cinchona and its preparations to the health of mankind, especially referring to its use in the treatment of a class of diseases peculiar to tropical and miasmatic localities. The memorial states that the tree may be transplanted, and, under the proper conditions of cultivation, will furnish a bark equally efficient with that brought from South America. It is urged that only two questions remain to be considered: 1st. Is not the supply so near at hand as South America

inexhaustible? 2d. Have we within the limits of our own country the proper climatic and other conditions to grow the tree with success? With regard to the first, the reckless destruction of the trees is shown, and the fact that the supplies from South America are not nearly sufficient to meet the demand, the price being kept so high as to place this inestimable remedy beyond the means of millions of natives of fever-visited regions. In reply to the second question, facts are cited to show that the cinchona may be propagated with success in California, in which State localities may be found where it may be grown as readily as in India, where its cultivation has been attended with success. The association recommends the appointment by Congress of a committee of scientific men to investigate the practicability of cinchona cultivation in the United States, with authority to visit South American countries, and to negotiate for and obtain a proper quantity of seeds and plants.

A copy of the memorial having been referred to the Department by Dr. L. J. Deal, of Philadelphia, chairman of the memorial committee, for the purpose of ascertaining its opinions upon the general subject, the Commissioner expressed the following views:

From the records of this Department, I learn that efforts to procure plants of the best species of the cinchona were made several years ago, and at the present time there are several hundred plants fit for transplanting, as soon as a suitable site can be ascertained, and a suitable and responsible person found who will give the plants a fair trial, this being the mode by which the Department introduces new seeds and plants.

The request of the American Medical Association, that Congress appoint a commission of scientific men to proceed to South America for the purpose of determining the best species for transplanting, seems to me altogether unnecessary, since such determination has already been fully made by other nations, whose deductions cannot, I presume, be questioned, as the best botanists and chemists have been consulted, and their conclusions published to the world. With reference to procuring plants from the native woods, it would be a very precarious and doubtful method, in view of the fact that young plants, as well as seeds, can now be procured through ordinary commercial channels, at a comparatively trifling cost, and in such quantities as may be desired.

It seems to me that the only question to be determined, is that of a proper locality for the test of growth; and, in this connection, it occurs to me that the kind offer of the Sacramento Medical Society to endeavor to find a proper habitat for the cinchona tree, offers the most practicable mode of securing such test. The locality being found, we furnish the plants for the test.

It strikes me forcibly that it is a mistake to suppose that the cinchona will find proper condition of climate immediately below the *sequoia*. The requirements of these two genera are too widely different to warrant this conclusion. The *sequoia* endures a zero cold, while the cinchona, under similar conditions of treatment, is injured when the thermometer descends to 32°, or freezing-point. Neither is it an absolute necessity that a mountainous region should be selected; the great point is one of freedom, entire freedom from frost; cultivation will modify other peculiarities necessary to success.

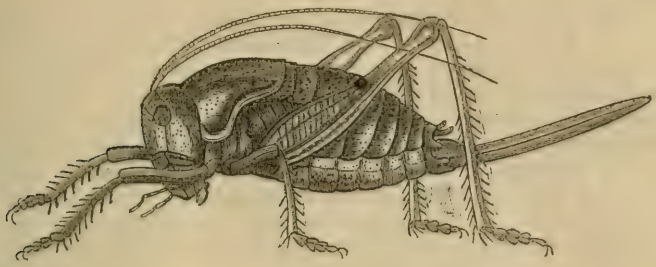
ENTOMOLOGICAL RECORD.

BY TOWNEND GLOVER, ENTOMOLOGIST.

THE WINGLESS GRASSHOPPER, OR "CRICKET," OF UTAH.—In common with the grasshoppers which are so numerous and destructive in the Western States, there is another orthopterous insect which swarms in untold numbers in Southern Idaho and Utah, and is known by the common name of "cricket." This is the *Anabrus simplex* of Haldemann, (Fig. 4,) and is mentioned in Stansbury's Great Salt Lake Expedition. Rev. Cyrus Thomas, who has studied the habits of this insect in Utah, states that it is found on the ground in immense swarms, and that in

at least two instances he has seen armies of them, at least two hundred to three hundred yards in width, packed closely together, moving across

Fig 4.



the road, apparently in search of water, as there was a creek a short distance in the direction in which they were going. The vegetation of the neighborhood was coarse grass, but Mr. Thomas states that he could not say positively as to their eating it or damaging the vegetation to any considerable extent, although it is highly probable that they do, as they appear to be almost omnivorous, collecting in great numbers on the dung dropped by horses, and feeding upon it. In several instances they were observed catching and eating the *Cicadas*, which were also in immense numbers on the bushes. The eggs are laid in the open plains, and in the act of deposition, the ovipositor of the female is placed in an almost perpendicular position, being inserted into the earth nearly its whole length.

Mr. James McKnight, who lives in Salt Lake City, states that when the Mormons first emigrated to Utah this cricket appeared in immense swarms, destroying their whole crops of wheat, &c., and that the second year they also appeared, but providentially, or miraculously, as it was deemed by the Mormons, vast flocks of white gulls suddenly appeared and destroyed the crickets to such an extent as to almost eradicate them for the time being, thus saving the remainder of the crop, upon which alone the half-starved Mormons had to rely for food for the next season. Since that time, these birds are held almost sacred in Utah. This so-called cricket, *Anabrus simplex*, can readily be distinguished from another brown cricket-like insect which also inhabits Utah, *Udeopsylla robusta*, which differs from the first-mentioned by being of a mahogany color, and by having sharp spines on the under side of the posterior thighs. It is never so numerous, but being found in the same section of country, these different insects have been frequently confounded by the common people. These "crickets" are eaten by the native Indians, generally roasted and pounded into a coarse-grained meal, a sample of which, from Camp Harney, Oregon, is on exhibition in the museum of the Department, known as "pulverized crickets," among which the heads and legs of *Anabrus simplex* are very abundant.

In an agricultural journal a notice appears that "a machine has been invented at Salt Lake City to kill grasshoppers, the great pest of that region, and consists of a frame drawn by two horses, having an apron projecting forward close to the ground to scrape up the locusts, with a hood above it, forming a box, open in front. At the rear of the machine is a pair of rollers geared together, the upper one driven by the carrying-wheels, of which it forms the axle. Whatever finds its way into the front of the machine is passed between these rollers and effectually

destroyed." Such a machine might be of utility where the injury done by grasshoppers would warrant the expenditure necessary to make it, but in order to be of much use, it should be constructed so that the insects once swept into the mouth of the machine could not escape again. This might be accomplished by making the opening in front of double cloth, the inner net or bag being much shallower than the outer one, and ending in a small opening into the main bag like a fish-fyke. The insects should then be forced to pass between the rollers by means of something like a revolving scraper, or they would be very apt to clog up in the hinder end of the machine, and not pass between the rollers at all. For the flying grasshoppers, such as *Caloptenus spretus*, &c., mentioned in our January report, it might be advisable to use the machine when they are yet in the larva or pupa state, and before they acquire wings, by means of which they would be able to escape being swept into the mouth of the machine.

CHEMICAL MEMORANDA.

BY R. T. BROWN, CHEMIST.

An interesting discussion is in progress among the chemists of continental Europe, on the true character of that substance which forms the frame-work of plants, generally known as *woody fiber*. Chemists have heretofore considered this as a single proximate element, but the researches of Dietrich and König have pretty clearly established the complex character of this substance. There is first the true frame-work, or vegetable fiber, consisting, substantially, of organized starch. To this substance the term *cellulose* has been appropriated. Covering this true skeleton is found a second substance, much denser than the cellulose, and containing the chief part of the mineral matter remaining as ash after the plant is burned. This is called *lignin*. These terms have been heretofore applied indiscriminately to woody fiber.

The point of interest in the discussion lies in the fact that cellulose is largely digestible, while lignin is almost indigestible. Dr. Märcker, at Weende, has conducted a series of instructive experiments on the digestion of hay by sheep. Of the crude fiber of meadow hay he found that about 60 per cent. was digested, and the 40 per cent. which remained in the excrement consisted chiefly of the lignin, containing a large proportion of the mineral elements of the food. Of the albuminous portion of the hay, but 55 per cent. was digested, while the non-nitrogenized substance, such as sugar, gum, &c., proved more digestible, 68 per cent. having disappeared. When the experiment was repeated with hay of the second cutting, in which the woody fiber had not fully matured, it was found that 68 per cent. of the crude fiber was digested. Professor E. Wolff has made similar experiments with red clover hay, with results almost identical. He ascertained, however, in another experiment, that clover which was cut before it had blossomed was about one-sixth more digestible than that which had passed the bloom before it was cut. From these experiments it is fairly to be inferred that the increased weight which grass acquires in ripening is from the increase of indigestible lignin, and not from digestible cellulose. Meadow grass or clover cut at or before blooming is worth 16 per cent. more than an equal weight cut after it has matured. The nutriment in the seed of timothy

hay is an unknown quantity in these experiments, and will change the results somewhat.

ORANGE CULTURE.—Mr. J. H. Gates, of Pilatka, Florida, inquires what manures are best adapted to the rapid growth of his orange grove. The following points were submitted in answer:

The orange belongs to a class of plants the ashes of which are rich in alkalies and alkaline earths. This indicates a demand for potash, lime, &c., in the soil. If the ground was originally pine forest, it will be improved by the liberal use of wood-ashes, soap-boilers' refuse, or other manures rich in alkaline matter. If, however, the soil was hard-wood forest, and has not been exhausted by grain-cropping, it probably contains all the alkaline matter that the grove will demand.

If the subsoil rests on limestone it will be sufficiently rich in lime for the supply of the trees; but if it is a stiff, tenacious clay, it will require (after thorough underdraining) a good dressing of fresh slaked lime to render the clay friable and easily pulverized. Barn-yard manure, unless it is well composted or thoroughly rotted, is not well adapted to tree culture. Leaves, composted with three or four times their weight of swamp-muck, make the best tree manure we can command. If leaves are hard to obtain, the proportion of muck may be increased without material injury.

Guano, from the rich supply of phosphates which it furnishes, is better calculated to promote the growth of seeds in plants, than to develop wood; consequently it has never been a very popular tree manure. If the climate will permit the growth of some crop which, like clover, will act as a mulch at first, and afterward as a manure, it will greatly promote the growth of the grove.

WOOD ASHES.—In answer to several inquiries concerning the value of wood ashes as a manure, we reply that ashes from the wood of the hickory, sugar-maple, elm, &c., contain about 50 per cent. of potash compounds, consisting chiefly of combinations with carbonic acid and silica, while the ashes of pine wood will rarely yield more than 20 per cent. Ashes saved from clearings often contain earth mixed with them, in gathering the remains from fires. When wood is used for burning lime, the ashes are often put into the market largely mixed with that substance. Sifted coal-ashes are sometimes used to adulterate wood ashes, and the fraud can hardly be detected by the eye.

Leached ashes always retain a portion of potash, usually in combination with silica or phosphoric acid. These compounds are slowly soluble in water, and, therefore, are not removed in leaching, but they are valuable, especially to grain crops and grasses. Ashes, whether leached or unleached, should never be suffered to go to waste. Even coal ashes may be used to good advantage on stiff-clay soils. Their effect, however, is more mechanical than chemical.

BONES AND BONE-MEAL.—The complaint of fraud in the manufacture of commercial manures gives rise to many questions concerning the manufacture of bones into some available form by the farmer himself. This is a very important subject, and yet it is one beset by many difficulties. To a majority of farmers in this country bones are the only reliable source of supply to replace the phosphates carried away by the annual exportation of grain, beef, and pork. But bones broken into fragments of not more than an ounce in weight each will, under ordinary circumstances, remain in the soil undecomposed for half a century, and consequently but little benefit will be derived from their use. Bones,

to be of immediate value, must be ground fine; but this with "raw bones" is a very difficult process. Bones subjected to the action of high steam lose all their oil, and a large portion of the gelatine which so obstructs the grinding, and thus become brittle, and quite easily ground on a common mill. The same end can be reached more directly by burning the bones, the waste being merely the animal matter contained in them. The phosphate of lime is unaffected by either steaming or burning.

The mineral part of the bones, thus separated, will be found to consist substantially of 45 per cent. of phosphoric acid and 55 of lime. This compound is insoluble in pure water, and but very sparingly soluble in rain-water charged with carbonic acid. If we take this "bone phosphate" and add to it a little more than half its weight of sulphuric acid, (commercial oil of vitriol,) we will in a few days produce a new compound, in which the sulphuric acid has removed two-thirds of the lime from the bones, combining with it to form gypsum, supplying the place of the lime thus removed with water. This is a true soluble superphosphate. Its elements are—

Phosphoric acid	60.69
Lime (calcium)	23.93
Water	15.38
	100.00

This mass will be found very tenacious, and somewhat difficult to handle. To remedy this it should be mixed, in sufficient quantities to render it dry, with some good absorbent, such as dry swamp-muck reduced to a powder, or with ground charcoal, or even with road-dust. Lime or ashes should never be used for this purpose.

Several farmers can co-operate in the construction of a mill, and thus produce the bone-meal which they use at prime cost. From this they can make their own superphosphate, and use it either by itself or mixed with composted manure.

But bones may be reduced to a very fine state of division by the use of strong wood-ashes, and thus, presenting a large surface to the solvent action of water and carbonic acid in the soil, may be of great value in maintaining fertility. We suggest the following formula for using bones with ashes:

Ground bones	100 pounds.
Strong wood-ashes	400 pounds.
Soda saltpeter	70 pounds.
Epsom salts	10 pounds.

Dissolve the soda saltpeter and epsom salts in sufficient water to thoroughly moisten the ashes and bone-meal. Mix well, and let it stand ten days, stirring it daily. Use some absorbent, such as dry muck pulverized, to dry the mass and reduce it to powder.

German potash (150 pounds) may be substituted for the ashes, in whole or in part. This amount used on an acre will have a marked effect on the crop.

GERMAN POTASH.—Potash being so important an element of fertility in the soil, and in several varieties of the soil being the point where exhaustion first shows itself, many intelligent farmers are anxious to know more about the probable sources of supply from which their fields in future are to be furnished with this indispensable element of nearly

all their crops. If an acre of ground yield 25 bushels of wheat, the crop will remove, in the straw and grain, 24 pounds of potash; or if the crop be corn, at 50 bushels per acre, each acre will be taxed to furnish about 75 pounds of potash. It is true that a large amount of this is returned to the soil, if the straw and stalks be not wasted; yet there is a large expenditure in the grain which is put into the market, and which is an entire loss to the soil. A few years ago nearly all the potash of commerce was obtained from wood-ashes by the process of leaching. The large demand for the article in various manufactures, and the failing supply of wood-ashes, induced various efforts to manufacture potash salts from feldspar and from sea-water. These efforts would probably have been successful but for the discovery of immense deposits of chloride of potassium associated with the mines of rock-salt at Stassfurt, in Prussia. The saline deposit is nearly 700 feet thick, (200 meters;) 500 feet of the lower portion of which being nearly pure rock-salt, (chloride of sodium,) while the upper member consists of a mixture of the sulphate of magnesia, chloride of sodium, and the double chloride of magnesium and potassium, the last-named salt forming 55 per cent. of the compound. This upper, or potash member of the mine, is about 90 feet thick, and sufficient explorations have been made to warrant the conclusion that at least six millions of tons of chloride of potassium may be taken from it.

The potash is separated from the other salts at the mine, and is chiefly sold as "muriate of potash," which is nearly a pure potassic chloride. A considerable portion of it, however, is now converted into carbonate of potassa, by a process similar to that by which soda is produced from common salt, and the manufacture of caustic potash is also carried on at this place to a considerable extent. The amount of potash annually produced from the mines of Stassfurt is stated at about 30,000 tons, chiefly in the form of the "muriate," which is fast becoming a current article of commerce in all the market centers of Europe and America. The price at the mines is reported to range from $30 to $40 per ton, according to the degree of purity. At this price, allowing a fair margin for transportation and profit, Prussian potash can be advantageously used as a fertilizer in this country. But it certainly would not be advisable for an American farmer to look to Germany for potash to supply his crops, while he suffers ashes to go to waste on his farm, or in his neighborhood. The discovery of mineral potash at Stassfurt warrants the hope that the great alkaline plains, which form so large a part of the central plateau of this continent, will, at no distant day, furnish a similar supply.

SCIENTIFIC NOTES.

FOREIGN COMMENDATION OF THE REPORT OF THE AGRICULTURAL DEPARTMENT.—We find in "Nature" an appreciative notice of the annual and monthly reports of the United States Department of Agriculture. Much astonishment is expressed in the article at the unexampled magnitude of the editions of these works published; and inquiry is made as to why similar enterprises are not conducted by the government in Great Britain. Noticing, particularly, the fact that our Department of Agriculture has charge of everything connected in any way with the interest in question, and that it not only prosecutes inquiries, but publishes valuable and thoroughly digested reports on the different subjects, it calls

attention to the absurdity of the British practice of dividing the same duties among a number of distinct establishments. Thus the privy council has charge of science and art, the education of children, and the diseases of animals. Again, the copyhold, tithe and enclosure commission is state authority on drainage and cottages, as well as the national land-surveyor, valuer, and actuary. The statistical department of the Board of Trade is required to prepare, in addition to the report upon imports and exports, an account of the agricultural condition of the country from year to year. The local-government board, the local-act department and poor-law board, with a number of other departments, are more or less connected with the agricultural interest; while, upon the board of customs, agriculturists are dependent for the enumeration of agricultural imports and exports, and the nation looks to it for the collection of the revenue generally. The writer in "Nature" finds much to commend in the fact that all these numerous departments are concentrated in the one establishment in the United States. When it comes to the dissemination of information upon these various subjects, the reviewer considers Great Britain still further behindhand, as no special care is taken towards this object. The Royal Agricultural Society of England does as much as any private establishment conveniently can; but is unable, of course, to act on a very large scale. The article winds up by stating that the United States Department of Agriculture presents features which may be profitably copied by the British executive government and others, and which are equally instructive both to British agriculturists and men of science.

REMEDY FOR THE RAVAGES OF THE GRAPE-VINE SCOURGE.—The alarm created in France by the increasing ravages of the grape-vine louse, *Phylloxera vastatrix*, continues unabated, and grave fears are entertained and expressed in regard to the future of the wine-producing interests. Numerous remedies have been proposed; few if any of them, however, of much apparent value. Among those most relied upon have been, first, the collection and destruction by fire of the vine-leaves bearing the special galls of the *Phylloxera;* second, tearing up the diseased plants by the roots; third, the employment of various poisonous substances, among which those most in favor are carbolic acid, certain essential oils, and bisulphide of calcium; fourth, the reconstruction of the vineyard by grafting the vine with the American *Vitis labrusca.*

There is one difficulty in regard to the first remedy. The galls, which are abundant in America and about Bordeaux, do not exist in the vineyards of the south of France. There the insect is born, lives, multiplies, and dies, exclusively upon the roots of the vine. The second method is also of little account, since a vine may be seriously affected without showing any external symptoms; these manifesting themselves simultaneously over the entire vineyard, and involving the destruction of the whole. The use of poisonous substances, also, has given few results of any value, especially as it is only the superficial rootlets that can be reached, while the more deeply seated cannot be influenced. The fourth method, of grafting on the American grape, is one the success of which is problematical, and although, so far, there seems to be a greater power of resistance in this species than in others, there is no telling how soon this variety may cease to possess comparative immunity.

In view of all these circumstances M. Faucon has recommended very urgently the propriety of so planting the vineyards as to permit them to be inundated during the winter season, just as is done in the

case of cranberry-patches. He has tried this experiment on a very large scale during the past winter of 1870–'71, and has found the most gratifying result. Plants which had been seriously attacked, and which were on the point of being torn up and burned, were found in the ensuing spring to have recovered their vigor, and a careful examination failed to reveal the slightest traces of the destructive enemy. This application can only be made, however, to vineyards having a level surface and suitably arranged for the purpose. But M. Faucon is of the opinion that only such vineyards as can be treated in this manner can be maintained, and that all which are situated on the slopes of hills must be given up, unless some special arrangements can be made for the purpose of overflowing the roots of the vines.

THE SPECTROSCOPE, IN TESTING THE PURITY OF WINES.—Among those who have made a practical application of the spectroscope to various purposes in domestic economy and the arts, is Mr. J. C. Sorby, of England. He uses as a scale an interference spectrum with dark lines, by means of which the spectrum is divided into twelve optically equivalent sections. With this instrument he has lately investigated the coloring matters of Brazil-wood, and of logwood, in wine; first shaking the latter with ether, and then evaporating the etherial solution obtained, treating the residuum with water, displacing this with carbonate of ammonia, and then testing the solution with the spectrum microscope. The question of a mixture of the coloring-matter of the ratany-root or of the poke-berry (*Phytolacca decandra*) is determined after the wine has been reduced to a smaller volume by evaporation, and the residuum treated with alcohol. The age of port, and other dark wines, may be determined by means of this apparatus.

IMPROVED MODE OF BREAD-MAKING.—*Les Mondes* gives an account, by Dr. Seziile, of an improved method of bread-making from entire wheat: This consists in first removing the husk of the grain by means of properly constructed machinery, and then acting upon it several times with tepid water, at about 176° F. for the first bath, and 104° for the second, by which the cover of resinous gum of the grain is dissolved and removed. This removal is necessary, on account of the fact that this substance becomes very deep brown—almost blackish-colored by the fermentation of the dough. The grain, during the treatment in question, absorbs from 65 to 70 per cent. of water, and is then reduced to a paste by means of machinery very similar to that used in chocolate-mills. This perfectly white paste is next leavened, and, after fermentation, is ready for baking. By this process, from the same quantity of grain which, by the usual method, furnishes 235 to 240 pounds of bread, the yield is increased to 320 pounds, of very superior quality, and far greater nutritive power. In addition to this, a very considerable saving of labor and expense is the result of the application of this new process, which has been thoroughly tested by competent and independent scientific, as well as practical, men.

CARBONIC ACID OF THE ATMOSPHERE.—A course of experiments upon the amount of carbonic acid in the atmosphere has been prosecuted at Rostock, for several years past, by Professor Schultz, who communicated the results of his inquiries at the last meeting of the Society of German Naturalists and Physicists. The percentage found by him appears to be much less than that hitherto indicated by most observers; the quantity detected amounting to only about 2.9 of the acid in 10,000 volumes of the air. Variations according to the time of day and year, noticed by

other observers, were not found in the Rostock experiments. On the other hand, however, meteorological phenomena appeared to exercise an undoubted influence. Thus, a snow-fall was frequently connected with a constantly increased percentage; while rain produced a precisely opposite effect. These influences are not constant; indeed, with snow there was sometimes found a less degree of acid, and with rain a greater. The direction of the wind, however, exercised a constantly appreciable influence. With atmospheric currents from the northeast, the carbonic acid was increased while with a southwest wind it was diminished. This fact led Professor Schultz to the impression that the sea was a constant absorbent of carbonic acid from the atmosphere, and that the average percentage was kept up by volcanic exhalations, animal respiration, processes of decomposition and combustion, and other causes developed on the land. Professor Schultz is now engaged in endeavoring to learn to what the absorptive power of sea-water is due, and has already ascertained that sea-water, when boiled, absorbs scarcely one-fourth part as much carbonic acid as sea-water which has lost its carbonic acid by the action of hydrogen.

Effect of drainage and sewage on mortality in Calcutta.—The extent to which disease depends upon drainage and sewage may be gathered from the report of the results of sanitary improvements in Calcutta. In that portion of the city inhabited by the native population, the cholera fatality for twenty years prior to 1861 averaged nearly 5,000 deaths per annum. In 1860, the deaths were 6,000 by cholera; and in 1866, nearly 7,000. About this time works of drainage and water supply were commenced, and have been gradually extended; and as a result, the use of foul tank and river water was discontinued; this benefit being conferred upon the city in the beginning of 1870. As the first result of this action, which is confined to a limited portion of the city, the mortality from cholera in 1870 was only 1,563, the general mortality also diminishing year by year with the extension of the works. The entire death-rate in 1870 was only 23 in 1,000—considerably less than half what it was in 1865.

Phosphate beds on the Dniester.—The immense deposits of mineral phosphates in South Carolina bid fair to be matched by those lately discovered on the banks of the Dniester, in Eastern Europe. From a report of an investigation by Schwackhöfer, ordered by the Austrian government, we learn that these phosphatic concretions differ from those hitherto observed, in being almost entirely globular, with concentric radiated joints in their interior, and varying in diameter from half an inch to eight inches. When powdered and heated, in the dark, a bluish, phosphorescent light is observed. The region in which the phosphorite balls occur is characterized by the existence of silurian and cretaceous strata, all intermediate formations being wanting. The silurian strata are principally represented by limestone and clay slate, and the latter is either coarsely granulated and compact, or in smooth, lustrous sheets. It is in the latter alone that the phosphatic balls occur, and, indeed, only where this slate is immediately covered by the chalk-marl. From these considerations, it is inferred that the balls consisted originally of carbonate of lime, which have been transformed into phosphorite by the infiltration of phosphatic salts. The original material of these chalk concretions was doubtless supplied by the chalk-marl overlying the slate in a manner familiar to geologists, and it may fairly be presumed that the phosphoric acid of the mineral is simply the product of leaching out of the phosphatic slate above referred to, since all

the other constituents of the slate besides phosphoric acid are found in this mass. Herr Schwackhöfer imitated the mode of forming these balls by taking boys' marbles and keeping them for several days in a solution of phosphate of soda or of iron, and observed the transformation into phosphate of lime. An acid phosphate of lime is first produced, which is subsequently changed into the insoluble salt. In nature this process must have been a long time in progress, but the result was sure to be attained ultimately. As to quality, this phosphate promises to be of very decided value, showing a positive superiority over that of the Sombrero Islands. It occurs in immense masses, and, in fact, is apparently almost inexhaustible.

NEW STUFFING FOR CUSHIONS.—A material which has come quite extensively into use in Germany, as a substitute for hair, in the stuffing of saddles, &c., consists of a mixture of flax-seed and tallow. The advantage of this substitute consists primarily in the fact that the mobility of the seeds, one upon the other, prevents the packing or settling in any particular place, as often happens in saddles stuffed with hair, thus causing any given pressure to be readily and uniformly distributed over any given surface. The tallow serves the purpose, too, of keeping the leather flexible, and of preventing the absorption of perspiration, protects the article itself, and prevents the back of the animal from becoming galled. Animals with sores or galled spots on the back can be ridden with saddles stuffed with this material without any great inconvenience. The tallow also has the effect of preventing the rotting of the flax-seed, and is to be added in sufficient quantity to give the requisite softness to the entire mass. An aromatic odor can be imparted by introducing oil of turpentine, or camphor powder, and the durability considerably increased thereby. One part of tallow to from six to ten parts of flax-seed may be used, according to the temperature.

CULTIVATION OF ESPARTO GRASS.—Considerable attention is now being paid in Europe and Algiers to the cultivation of a fibrous plant, which is called *alfa* in Africa, *atocha* in Spain, but in commerce is usually known as the *esparto* grass, (*Macrochloa tenacissima.*) This plant thrives throughout the entire coast of the Mediterranean, both in Europe and in Africa, and its cultivation is extending very rapidly, in consequence of the demand for it as a material for paper-making. It grows in very sterile regions, even in the sands of the Sahara, and thrives under excessive heat and in a dry, arid soil. It is peculiarly valuable on account of its great tenacity and its resistance to fermentation, for which reason it is used for sail-ropes and the rigging of vessels. The demand for this substance may be estimated from the fact that it was first brought into notice in 1862, when a cargo was transported from Oran to England, and that the amount sent out has risen from 10,000 quintals in 1863 to 370,000 in 1870. The value of this export from the Province of Oran, in Algiers, alone amounted to $1,500,000.

ABSORPTION OF NITROGEN BY PLANTS.—Dr. Cameron, in referring to certain experiments of Wagner, in which it was ascertained that maize grew and developed seeds in a solution in which kreatine was the only nitrogenous substance present, the kreatine being absorbed unchanged, remarks that, from his own experiments, he has found that plants may absorb unchanged, and apparently derive nitrogen from potassic nitrite, potassic cyanurate, and potassic ferro-cyanide.

EFFECT OF GERMINATION ON THE FAT IN SEEDS.—In a paper read before the Academy of Sciences, at Munich, by Dr. Vogel, upon the in-

fluence of the germination process on the fat contained in seeds, it is stated that this decreases in the ratio of from 0.094 to 0.320 per cent., or an average of 0.156 per cent.

VIENNA YEAST.—The good qualities of Vienna beer and bread are celebrated all over Germany, and are due to the excellence of the yeast used in preparing them. According to Dr. Vogel, the formula for preparing this substance is as follows: Previously malted barley, maize, and rye are ground up and mixed; next, put into water at a temperature of from 150° to 170° Fahrenheit; after a few hours, the saccharine liquid is decanted from the dregs, and the clear liquid brought into a state of fermentation by the aid of some yeast. The fermentation becomes very strong, and, by the force of the carbonic acid which is evolved, the yeast globules (the size of which averages from 10 to 12 millimeters) are carried to the surface of the liquid, and there form a thick scum, which is to be removed by a skimmer, placed on cloth filters, drained, washed with a little distilled water, and next pressed into any desired shape by means of hydraulic pressure, and covered with a strong and stoutly woven canvas. This kind of yeast keeps from eight to fourteen days, according to the season, and is, both for bakers and brewers, very superior to that ordinarily used.

FAT FOUND IN BEER YEAST.—In an article by Dr. Vogel, read before the Academy of Sciences, in Munich, after referring to the fact that all cereals contain a larger or smaller quantity of fatty matter, which is an essential constituent of the grain, the author describes at length his experiments made for the purpose of extracting, by means of ether, the fat contained in beer yeast, an oil boiling at about 200° Centigrade, specific gravity equal to 0.901; decomposed when heated above 300° Centigrade, and yielding acrolein. The quantity of this oil found in one liter of the yeast amounts to from 0.2 to 0.3 grams. It appears that this oil is in most respects similar to the fatty matter found in barley.

SEWERAGE SYSTEM IN MILAN.—The sewerage system adopted in Milan, is recommended by Mr. Child, of Oxford, as being suitable for small towns and country villages. Its essential feature is the drainage of the houses into water-tight cess-pools, which are emptied frequently, efficiently, and quite inoffensively, by means of a barrel-cart, previously exhausted of air, and a hose. The barrel-cart then conveys the sewage to a depot at a convenient distance, where all that is salable is sold to farmers, and the rest is manufactured into a kind of dry artificial guano. Many small towns and villages lie on dead flats or at the bottom of deep valleys, where ordinary sewerage works could not be established without an expensive provision for raising the sewage in order to render it available for irrigation. In such places the Milanese system might be carried out with ease, and at comparatively small outlay. A certain number of cess-pools must be rendered water-tight—a process not very expensive. One cess-pool would serve for several cottages, and frequent emptying would be better than large sizes of inclosures. Two barrel-carts must be procured, and these, with a small steam-engine at the depot to work the air-pump, would, together with about three men and two horses, form the whole of the apparatus required for testing the system on a small but sufficient scale. On the day on which Mr. Child visited the depot near Milan, farmers' carts were waiting there literally in scores, to obtain their supply of it; and he feels sure that, if landed proprietors or farmers were to give this system a trial in this country, they would find it worth adoption

DISTINGUISHING EDIBLE MUSHROOMS.—A writer in the English Mechanic gives what he considers to be an invaluable rule for distinguishing the true mushrooms from the poisonous species. He remarks, in the first place, that the true mushroom is invariably found in rich, open pastures, and never on or about stumps or in woods; and, although a wholesome species sometimes occurs in the latter localities, the writer considers it best to avoid their products. A very good point, in the second place, is the peculiar intense purple-brown color of the spore-dust, from which the ripe mushroom derives this same color (almost black) in the gills. To see these spores, it is only necessary to remove the stem from the mushroom, and lay the upper portion, with the gills downward, on a sheet of writing-paper, when the spores will be deposited, in a dark, impalpable powder, in a short time. Several dangerous species, sometimes mistaken for the true, have the spore umber-brown, or pale umber-brown.

In the true mushroom, again, there is a distinct and perfect collar, quite encircling the stem, a little above the middle, and the edge of the cap overlaps the gills. In some poisonous species this collar is reduced to a mere fringe, and the overlapping margin is absent or reduced to a few white scales. Lastly, the gills never reach to nor touch the stem, there being a space all around the top of the stem, where the gills are free from the stalk.

There are numerous varieties of true mushrooms, all of them equally good for the table. Sometimes the top is white and soft like kid leather; at other times it is dark-brown and scaly. Sometimes, on being cut or broken, the mushroom changes color to yellow, or even blood-red; at other times, no change whatever takes place. To sum up, it is to be observed that the mushroom always grows in pastures; always has dark, purple-brown spores; always has a perfect encircling collar; and always has gills which do not touch the stem, and has a top with an overlapping edge.

In addition to the method just indicated for testing the genuineness of mushrooms, we are informed that, however much any particular fungus may resemble the eatable mushroom, none are genuine nor safe the skin of which cannot be easily removed. When taken by the thumb and finger at the overlapping edge, this skin will peel upward to the center, all around, leaving only a small portion of the center of the crown to be pared off by the knife.

INTRODUCTION OF USEFUL PALMS INTO FLORIDA.—A memorial has been presented to Congress by Mr. Louis Baker, praying that the necessary steps be taken to introduce into the Southern States certain palms yielding sugar and fruit. Many years ago, Dr. Perrine, of Florida, memorialized Congress, urging the importance of taking measures to initiate the cultivation of various tropical plants, of the success of which he felt assured by the results of his own experiments. The untimely death of the doctor, not long after, prevented any further action in this matter, though it is not unlikely that, had he lived, Florida and other Southern States would be enjoying a variety of important vegetable products not now included in their industrial resources. Mr. Baker thinks the palms especially important, particularly those furnishing sugar and oil in large quantities. He presents statements showing the ease with which such trees can be planted and kept up, and vast returns obtained with very little expenditure of labor. Other species of palm, considered by him important, are the date-palm, the cocoa-nut, the sago,

&c. He also urges the planting of indigo, ginger, gunny, saffiower, the centennial hemp-plant of China, the camphor tree, &c.

CONVERSION OF CANE-SUGAR INTO GLUCOSE BY LIGHT.—The common impression that a solution of cane-sugar, kept at the ordinary temperature, and protected against the action of ferments, will preserve its taste and chemical proportion for an indefinite period of time, according to Riault, is a mistake; as he has observed in many cases that a solution of sugar-cane, without undergoing any ferment, will ultimately become altered, and be transformed more or less completely into grape-sugar. After considerable experiment, he has satisfied himself that this action is due to the influence of light, and that even when sugar-cane is found to be apparently adulterated with glucose, the inquiry should be instituted as to whether this was not the result of exposure to light rather than to intentional adulteration.

DELPRINO'S MODE OF TREATING SILK-WORMS.—The attention of visitors to the Italian section of the French Exposition of 1867 was attracted to certain small wooden pigeon-holes, each of which contained a silk-worm, where it was occupied in constructing its cocoon without disturbance from its neighbors. This was an invention of Dr. Delprino, of Vesime, in Piedmont, and which, although very simple in itself, formed an important innovation in the art of raising silk-worms. Since that time this and other peculiar inventions of the same gentleman have been widely adopted, and have done much toward protecting the silk interest from the losses which the recent multiplication of diseases and other casualties have brought about.

The difficulty in the ordinary magnaneries, or worm-houses, is that the worms are mixed together, the strong oppressing the weak, and also heaped upon each other in a mass, as to produce greater or less injury. In Delprino's system a life in common is interdicted as much as possible, although during the feeding of the worms it is impossible to isolate them entirely. During that period they are kept together, but allowed ample room for moving about—being placed on small movable hurdles which can easily be changed. This produces constant ventilation, and prevents the danger of a great agglomeration, in consequence of which the transformations marking the different ages involve much less loss. When they have attained the proper period for transformation to chrysalids, the worms are placed in what Delprino calls the cocoonry, the pigeon-holes (large enough to receive them) being placed vertically on each side on tables, in which the worm is able to move about with sufficient freedom, and yet suitably protected from any injury. It is believed that a saving of silk is thus secured, as there is no attachment of the cocoon to a branch, as in the ordinary method, involving a loss, according to the inventor of this new method, of twenty per cent.

Another of Dr. Delprino's methods consists in securing a perfect union of the two sexes, and a more certain fertilization of the eggs. This is done by placing the fly in a cell covered with a board and keeping it there in darkness and solitude for half an hour, at the expiration of which, to each male is given a female, and the board replaced until the nuptial operations have been accomplished. By another arrangement every female lays her eggs separately, so that those of two individuals are not mixed, and so that the imperfectly matured eggs (such as can easily be detected by examination) can be readily removed and destroyed, thereby improving the general quality of the grains. The general idea of Dr. Delprino's system consists in the isolation of the insects, and although this may require a special arrangement, and be

somewhat troublesome, yet it is maintained that the result sufficiently vindicates the propriety of the process, and that in the greater perfection of the eggs, and the improved health of the worms, and better quality and quantity of the silk, there is a decided superiority in the new system.

NEW PARASITE OF THE SPRUCE.—Much interest has been excited among botanists by the rapid development upon the black spruce and balsam firs of Northern New York of a parasitic plant belonging to the genus *Arcenthobium*, related to the mistletoe. In the vicinity of Warrensburgh about 75 per cent. of all the *Abies* were found to be infested, groups of forest trees forty feet in height being dead and bearing the peculiar marks of the infection. Dr. Gray remarks that what is curious about the discovery is, first, that it should not have been made before; and second, that it should, after all this overlooking, be found during the same season by two persons, in three different counties, and so abundant as to disfigure or even to destroy the trees it infests.

HUANO MANURE.—An important improvement in the manufacture of artificial guanos, the discovery of which affords for many cases a practical solution of the difficulty of disposing of sewage, has just been announced in Great Britain, having reference to a substance called Huano manure. This material, it is claimed, is as rich as Peruvian guano, and its manufacturers furnish a guarantee to that effect. It is worth, according to the scale of fertilizers, from $40 to $45 per ton, although its first cost, as manufactured, is less than $13 per ton. In the course of inquiries leading to the invention in question, it was first ascertained that Portland cement transforms night-soil into stone, which, upon being crushed, gives 18 per cent. of phosphate of lime; and when applied as a manure for growing turnips, has produced 26 tons to the acre. Owing to the insoluble nature of the phosphates, however, the action was slow, and the next step in the process was to utilize this property of cementation in the superphosphate manufacture, in which night-soil is substituted for water in the decomposition of the phosphates. During this process the phosphates part with the two portions of their lime, uniting with sulphuric acid to form sulphate of lime, (plaster of Paris,) from which is derived the valuable property of cementing night-soil from a liquid into a solid mass. This solidification produces simultaneous deodorization, removing all offensive and foul effluvia, as well as any capability of giving out deleterious gases, and such powers of destruction are transformed into fertilizing endowments. It will thus be seen that cementation lawfully usurps the place hitherto occupied by fermentation and evaporation, and hydrates all the moisture—which, being chiefly urine, possesses manurial value to the last drop—together with the incorporation of the whole of the ammonia, alkaline salts, and other valuable constituents existing in the night-soil.

The inventor, Mr. Hughan, has made arrangements with an extensive manufacturer of superphosphates to carry on the process, and great expectations are expressed as to the value of the results to be anticipated. The advantages of working the new patent, in connection with such a manufacture, are: 1. The night-soil gives that pasty condition to phosphates essential to the reception and dilution of the acid employed in superphosphate manufacture. 2. The phosphates are increased one-fourth in quantity from the alkaline phosphates and phosphoric acid of the soil; thus, if 75 units of phosphate of lime are introduced, 100 are withdrawn. 3. The phosphates receive a new supply of nitrogen equal to from 2 to 4 per cent. of ammonia from the soil. 4. The phosphates obtain

5 to 8 per cent. of alkaline salts, containing 1 per cent. each of magnesia and potash, from the soil. 5. The phosphates receive, in addition, 16 per cent. of organic matter intermixed with the urea and uric acid, possessing the latent quality of evolving ammonia to the last atom, and inducing nitrification, as well as the ammonia and nitrates as returned in the analyses. On the other hand, night-soil receives from phosphates the following advantages: (*a*) Cementation; (*b*) solidification; (*c*) deodorization; (*d*) portability by rail or sea in the service of agriculture; (*e*) the bringing within the pale of sanitary laws, contributing to health and to municipal revenues. It is even suggested that the present superphosphate manufacture must ultimately pass over into night-soil utilization, either voluntarily or by legislative enactment.

FACTS FROM VARIOUS SOURCES.

FULTZ WHEAT.—In the monthly report of the Department for August and September, 1871, a statement of the history and valuable qualities of this wheat was made. With reference to a particular test of its value a considerable quantity of the wheat was procured and distributed in various sections of the country. The most favorable accounts have been received up to this time, in relation to the condition and promise of the growing crop, and it is most probable that the Fultz wheat will prove to be a very great acquisition to the wheat-producing interests of the country. Mr. Shem Zook, of Mifflin County, Pennsylvania, who has carefully noted the experiments made with this wheat in the section where it originated, in a letter to the Department, says:

I am satisfied that this new variety of wheat is the same kind which, forty years ago, was known by the name of "yellow blue stem." It was then considered a very productive wheat. The objection to it then was the extra time and labor required to thrash it by the old and objectionable mode of treading out with horses; the thrashing-machine, however, obviates this difficulty.

On well-cultivated farms the yield of the Fultz wheat has been from 30 to 35 bushels per acre, though it has yielded as high as 40 bushels and upward.

Mr. Zook has furnished the Department with a number of statements of experiments made with this wheat, many under the seal of affidavits, some of which are here appended:

Solomon Peachey, on 38 acres, raised 1,417 bushels and 30 pounds, or at the rate of 37 bushels and 17 pounds per acre. Two acres of California wheat, sown alongside of the Fultz, yielded only 25 bushels per acre. Mr. Peachey's whole crop of wheat in 1871 was 2,317 bushels on 67 acres. John Peachey, on 26 acres, raised 862 bushels, or 33 bushels per acre. Christian Peachey, on 25 acres, raised 925 bushels and 50 pounds, or 37 bushels and 2 pounds per acre. Simeon K. Zook, on 40 acres, raised 1,517 bushels, or 37 bushels and 55 pounds per acre. Off of 20 acres of this ground a crop of wheat was taken the year before. The last crop received no manure of any kind; the ground, however, had been previously limed and enriched with barn-yard manure.

Mr. Richard Brindle, of Mifflin County, makes the following affidavit:

On five acres of limestone and flint land I plowed the clover-sod for corn, then put on 150 bushels of lime per acre. The following spring sowed with oats. On the oats stubble I spread a good coat of very rich stable manure, then plowed the ground once, going over it with a heavy three-horse cultivator; harrowed the ground twice, and drilled in two bushels of Fultz wheat on each acre. The yield of wheat was fully two

hundred and thirty bushels on the five acres, which weighed 61 pounds per bushel Yield per acre, at weight, forty-nine bushels and four pounds.

On three acres and one hundred and forty-four perches Mr. E. Kaufman reports a yield of 166 bushels of this wheat.

Mr. B. J. McLin, Salisbury, West Tennessee, is much pleased with the Fultz wheat. The young plants are much more vigorous than the native wheat.

Mr. A. J. Hamilton, superintendent of the western experimental farm of Pennsylvania, finds the Fultz wheat to stand the rigors of the climate very well, looking green and promising.

LOCAL STATISTICS.—Our correspondent in Jefferson County, West Virginia, Henry C. Evans, communicates the following statistics of the county:

Product.	Amount of crop.	Average per acre.	Acres to each crop.	Average price per bush., &c.	Total valuation.
Indian corn.....bush..	327, 525	14. 28	22, 926	$0 60	$196, 515 00
Wheat.....do...	335, 447	10. 9	30, 693	1 50	503, 170 50
Rye.....do...	11, 327	9. 5	1, 192	80	9, 061 60
Oats.....do...	49, 120	10.	4, 912	60	29, 472 00
Barley.....do...	152	8.	19	85	129 20
Buckwheat.....do...	493	7. 5	67	1 25	616 25
Beans.....do...	102	12.	8. 5	2 60	265 20
Potatoes, Irish.....do...	22, 440	55.	408	90	20, 196 00
Potatoes, sweet.....do...	225	50.	4. 5	1 50	337 50
Clover seed.....do...	800	1. 3	.....	7 00	5, 600 00
Turnips.....do...	550	50.	11	40	220 00
Sorghum.....galls..	864	36.	24	70	604 80
Wine.....do...	1, 200	120.	10	1 50	1, 800 00
Tobacco.....lbs..	6, 035	575.	10. 5	12	724 20
Hay.....tons..	4, 760	1.	4, 760	20 00	95, 200 00
Total.....	.....	.....	65, 045. 5	.....	863, 912 25

This shows an increased acreage of 600 acres, and an increase in total valuation of nearly $9,000, as compared with 1870. Clover seed, which was a very light crop in 1870, was not included in the table for that year, and the acreage of clover seed is not given in this table, because it is a second crop.

LIVE STOCK AT CHICAGO.—George T. Williams, assistant secretary, supplies the following report of receipts and shipments of live stock at the Union Stock Yards, Chicago, Illinois, for the year ending December 31, 1871:

RECEIPTS.

Source of supply.	Cattle.	Hogs.	Sheep.	Horses.
Chicago, Rock Island and Pacific Railroad	72, 406	384, 562	38, 810	838
Illinois Central Railroad	79, 438	449, 548	74, 874	1, 079
Chicago, Burlington and Quincy Railroad	188, 682	678, 501	91, 022	1, 737
Chicago and Northwestern Railroad	78, 697	532, 242	53, 485	1, 503
Chicago and Alton Railroad	105, 311	260, 058	27, 420	646
Pittsburgh, Fort Wayne and Chicago Railroad	486	7, 220	941	24
Michigan Central Railroad	1, 535	18, 377	5, 926	65
Michigan Southern Railroad	3, 989	28, 876	14, 476	18
Pittsburgh, Cincinnati and St. Louis Railroad	2, 395	10, 835	5, 905	26
Chicago, Danville and Vincennes Railroad	4, 360	17, 916	1, 987	.....
Driven into yards	5, 751	948	207	.....
Total in 1871	543, 050	2, 380, 083	315, 053	5, 936
Total in 1870	532, 964	1, 693, 158	349, 855	3 537

SHIPMENTS.

Source of supply.	Cattle.	Hogs.	Sheep.	Horses.
Chicago, Rock Island and Pacific Railroad	7,496	135	589	23
Illinois Central Railroad	8,226	461	345	13
Chicago, Burlington and Quincy Railroad	3,488	276	1,756	50
Chicago and Northwestern Railroad	3,863	1,544	2,169	659
Chicago and Alton Railroad	8,428	792	725	65
Pittsburgh, Fort Wayne and Chicago Railroad	124,599	290,062	67,417	1,414
Michigan Central Railroad	116,684	377,671	55,648	705
Michigan Southern Railroad	124,699	484,251	5,769	2,512
Pittsburgh, Cincinnati and St. Louis Railroad	4,444	7,094	666	41
Total in 1871	401,927	1,162,286	135,084	5,482
Total in 1870	391,709	924,453	116,711	3,488

TAPPAHANNOCK WHEAT IN OHIO.—Mr. G. S. Innis, of Columbus, Ohio, reports that, about the year 1858, he received from the Department one-half bushel of Tappahannock wheat, which he sowed carefully with a drill, obtaining 22 bushels, although the wheat crop of the county averaged less than 5 bushels per acre, on account of a severe frost on the 6th of June. The Tappahannock being earlier, escaped the frost and the red weevil, then very destructive. The following year he sowed 8¼ acres with a portion of the above product, distributing the rest. On his own land he obtained 42 bushels per acre, and all those to whom he distributed harvested good crops, ranging from 30 to 35 bushels per acre. Since that time thousands of bushels have been raised in that county, and always with success.

TAPPAHANNOCK WHEAT IN UTAH.—The secretary of the Utah County Agricultural Society, Utah, states that one quart of Tappahannock wheat, received from the Department two years ago, produced two bushels the first year, and one bushel of this sown in September, 1870, on 147 rods of medium land, following a crop of sugar-cane, produced 31 bushels of wheat, weighing 62 pounds to the bushel. Some of this crop, on being milled, turned out 42 pounds of good flour to the bushel.

SPRING-WHEAT IN CENTRAL ILLINOIS.—Mr. Seth Talbot, jr., of Tremont, Tazewell County, Illinois, says that farmers in that county have almost abandoned the raising of spring-wheat, and that, during the last five years, it has not paid for cultivation. Last year it was an entire failure.

WHEAT IN NEBRASKA.—Mr. L. A. Walker, of Omaha, Nebraska, calls attention to the great depreciation in the yield of wheat, per acre, in that region.

CEREALS IN UTAH.—Mr. George Roberts, of Minersville, Beaver County, says that the oats sent out by the Department have surpassed expectations, thrashing out 48 pounds per bushel. There had been a great deterioration of seed, but since supplies have been received from the Department a marked improvement has been observable.

WHEAT IN VIRGINIA.—Mr. William James, of Ashland, Hanover County, Virginia, claims that his State possesses the best conditions for wheat-growing, prime flour from Virginia wheat ranging $1 per barrel above prices of other market brands. He criticises the current methods of cultivation, and objects to the practice of shallow plowing in vogue in his section.

CULTURE OF CEREALS IN VIRGINIA.—Mr. John A. Packer, Tappahannock, Essex County, says:

The Fultz wheat and Excelsior rye and oats you so kindly sent me in October last all bid fair to afford a large yield for the quantity seeded. The wheat has more branches than I have seen. The cultivation of wheat, formerly our staple crop, we have to abandon and substitute other crops. Fifteen years ago we obtained from 20 to 25 bushels per acre. Now we do not average 5 bushels; and yet other crops have not diminished, thus showing that our failure to make wheat is not caused by want of strength in the land, but by other causes not yet discovered.

COTTON EXPERIMENTS IN NORTH CAROLINA.—Mr. F. A. Archibald, Concord, North Carolina, discards both Egyptian and Chinese cotton, as producing only half the quantity of lint of the Gulf cotton. He finds Boyd's Prolific to yield about 1,000 pounds of seed-cotton per acre, worth $18 50; Dixon, 850 pounds, worth $18 50; Gulf cotton, 750 pounds, worth $18; Holmes's Prolific, 750 pounds, worth $18; Peeler, 950 pounds, worth $20 25; Egyptian, 375 pounds; Chinese, 300 pounds.

SEA-ISLAND COTTON.—Mr. Evan Evans, of Charleston, South Carolina, says the cultivation of sea-island cotton has become so precarious from uncertainty of labor and want of capital that it must be superseded by some other crop. He therefore solicits jute-seed for his plantation on Saint John's Island.

GRAPES AND WINE ON KELLEY'S ISLAND, LAKE ERIE.—Addison Kelley, president of the Kelley's Island Wine Company, says:

The Kelley's Island Wine Company have made this year 155,000 gallons, and other parties here 132,000 gallons. The Kelley's Island Wine Company made an addition of six new wine-cellars, each 128 feet long, and put in six steam-presses, adding 250,000 gallons capacity, and making the whole capacity 350,000 gallons.

NEW CONDITIONS OF CULTURE IN FLORIDA.—A correspondent in Alachua County says:

I formerly owned one hundred and ten slaves, and made 100 bales of sea-island cotton. I had a large stock of cattle, &c. I now own 2,000 acres, one-half cleared and fenced. In 1866 I worked eighty-five hands, thirty of whom were males. I am now convinced from experience that four plows, with high manuring and diversity of crops, will furnish a better support and a larger income than I formerly received from all my former slaves.

I shall plant 10 acres in arrow-root this year. From an experiment with a quarter of an acre I made at the rate of $500 per acre. The yield is large and certain, but the process is tedious. If you could tell us where the machine could be got to grate or pound it, or indicate the best process of drying, &c., we could make enough in a few years to supply the demand without importation.

IRRIGATION IN UTAH.—Two bills have been introduced in Congress in aid of irrigation in Utah. One of these contemplates the incorporation of a company with a capital of $1,000,000, for the irrigation of Bear River Valley, by means of a canal to be constructed from the lower falls of Bear River to the northern end of Great Salt Lake; and it is proposed that, for this purpose, three sections of public land per mile on each side of the canal be granted to the company. The canal is to be 10 feet wide at the water-level, and 4 feet deep, and is to have a uniform current of not less than two miles per hour. The other bill has in view the construction of a canal on each side of the Jordan River, to irrigate and reclaim desert-lands lying along that river, and extending from Utah Lake to Great Salt Lake. For this purpose alternate sections of land lying between the lines of the canals and the river are to be granted to the Territory of Utah; the land and its proceeds to be applied solely to the enterprise in question; sales to be authorized only as the work progresses. The legislature of the Territory is empowered to incorporate a company or companies, and to transfer to

these parties the rights of construction and the lands and franchises therewith connected.

CORN IN MASON COUNTY, ILLINOIS.—Mr. J. Cochrane, of Havana, Illinois, in a letter dated February 1, offers an approximate estimate of the corn crops of Mason County, with a statement of the basis on which the estimate is formed, embracing the following points: Corn is bought at thirteen points on three railroads, and also for shipment on the Illinois River, at Havana. The amount of the current crop taken up by buyers at the latter place is reported by them at 500,000 to date, and the other points have taken 1,000,000 bushels. The amount coming forward, unsold, is 1,500,000 bushels, and the amount absorbed in stock-feed is put at 1,000,000 bushels, (although this is probably much below the actual amount,) making a total of quite 4,000,000 bushels. The crop of last year was cut short by drought and chinch-bugs, and the corn product of the county, in a fair season, may be safely placed at 6,000,000 bushels.

CHEESE.—In the six principal dairy counties of Scotland it is estimated that the milk of rather more than 100,000 cows is utilized for the purpose of making cheese. The product is 18,000 tons annually; worth, at the average price of last year, about $5,000,000. The Ayrshire cows, that are eminent for their milking qualities, even when fed on poor pastures, form the favorite breed. The cheese is made for about one hundred and ninety days in the summer period of the year. After this this milk is made into butter; or, if near a railroad station, sent into town for sale. The American cheese-factory system is gradually being adopted. The consumption of cheese is rapidly increasing and is appreciated by the laboring classes, entering largely into their daily diet. The reports of the American dairymen's associations are reprinted in England. Many of the old English brands of cheese are passed by and declined on coming into competition with recent American importations.

SPLENIC OR PERIODIC FEVER IN CATTLE.—Professor Gamgee's report on this disease, which was made to the Department of Agriculture and published in the annual report of 1869, is being republished in England as an object of equal interest to farmers in both Europe and America.

CONDENSED MILK has become an article of extensive use in London, as well as for shipping purposes. The shelves of English grocers are filled with the product of the Anglo-Swiss Company, which has 2,000 cows, and the Aylesbury Company, that has 1,000. There are several other large milk companies whose brands are well known to the shipping trade. In Switzerland, Bavaria, and several districts on the continent, are large companies engaged in preparing condensed milk. The competition thus induced in its manufacture, with the application of science, has resulted in producing an article of great purity. Dealers in milk are now fined heavily in England when convicted of diluting the article with even sixteen per cent. of water.

ARGENTINE EXPOSITION.—The official report of the Government commission on the trial of agricultural machinery at Cordova, in the Argentine Republic, has been received at the Department of Agriculture. As was to be expected, the contributions from the United States formed a prominent feature of the exhibition. Of 151 entries of plows, mowing-machines, reapers, harrows, seed-drills, cultivators, thrashing and mow-

ing machines, sugar-mills, horse-powers, steam-engines, &c., 89 were from the United States, embracing the firms of Collins & Co., Hartford, Connecticut; the Ames Plow Company, Nourse, Mason & Co., and Page & Son, Boston; John Moore, Geo. M. Sergeant, Treadwell & Co., Fords & Howe, F. Nishwitz, A. Platt & Co., Goodwin & Son, W. A. Wood, Sheble & Fisher, and A. Jack & Sons, of New York; and others. The sugar-mills, horse-powers, and locomotive steam-engines were prominent among the articles exhibited from England.

To destroy disease germs in clothing.—For this purpose the beds and clothing from the scarletina patients, at the sanitaria of large institutions in England, have been baked at a high temperature. Researches seem to show that the miasm is not destroyed by the heat of the disinfecting chambers; also that steeping the patient's clothing, before washing, in a strong solution of bleaching powder frequently injures it. To obviate these objections, Dr. Calvert, who has devoted much attention to the study of disinfectants, and sanitary chemistry generally, recommends a dilute solution of carbolic acid. It is easy to mix, profectly soluble, has no injurious action upon fabrics in the diluted state, and the editor of the London Microscopical Journal thinks it will insure the complete destruction of any of the lower organisms.

Cinchona.—The British government has established a Cinchona plantation at St. Helena, at an elevation of 2600 feet above the sea. The London Journal of Botany states that there are now nearly one thousand trees, in a fine healthy condition, the tallest between 7 and 8 feet above the ground. The nature of the land forming the plantation is very steep and rugged. The entire cost of the trees, exclusive of the superintendent's salary, is about $1 50 each. Plantations of pines and other valuable timber trees have also been established, and efforts are making to introduce the cultivation of tobacco and guinea hemp, *(Sanciera guineensis,)* the latter valuable for its fiber. The superintendent is training up a number of apprentices with a view to their being ultimately useful in the island, where the arts of horticulture and arboriculture have been much neglected.

Sheep-husbandry in Pennsylvania.—Mr. J. S. Elder, of Darlington, Beaver County, complains that farmers in that region are pursuing the old routine in live-stock husbandry, buying at high prices and selling out at low prices in a panic. Because sheep-men last fall made the most money all live-stock enterpise is now directed toward sheep. Cattle and hogs are down. Mr. Elder describes a disease among sheep called the "poll disease," as destructive as the hoof-rot. In two seasons he lost his entire flock of 180.

Wheat-seed in Wisconsin.—Mr. George B. Kidder, president of the Star Prairie Farmers' Club, says:

> The same kind of seed which we sowed in this vicinity eight years ago would produce, on new land, from 25 to 30 bushels per acre, while now the same seed sown on new land will not produce more than 10 to 15 bushels per acre. The variety sown here for the last ten years is the Scotch Fife wheat. I have no doubt that the largest heads might have been gathered each season for eight or ten years, and thereby have improved the seed the same as potatoes or corn can be improved. I have picked the best ears, and those which got ripe the earliest, for several years, and have, thereby, improved my seed and made my corn from ten to fifteen days earlier; and I think the same can be said of any kind of grain or vegetable.

Ramie cleaning machinery.—Mr. T. H. Murphy, of New Orleans, Louisiana, claims to have "invented machinery that can be worked in

the field to clean the fiber like dressed flax, from 1 to 15 acres per day only requiring from two to five men, with suitable horse or steam power.

WOOL FROM NEW SOUTH WALES.—The secretary of the agricultural society of New South Wales writes to the Commissioner that, owing to present facilities of communication with New York, via San Francisco, wool-buyers from the United States are now purchasing in the Australian rather than the English market. He states that he has shipped to R. U. Forbes & Co., New York, for the Chamber of Commerce of that city, thirty-three fleeces of wool which were presented at the last exhibition of the society in Sydney, and requests the Commissioner to arrange for an examination of these samples by competent judges. The society proposes a system of exchanges of blooded stock between this country and New South Wales. The secretary says that on one or two occasions rams have been received from the United States, but that they did not appear to be the best specimens; not equal to descriptions given in the reports of the Department.

A report of awards on wool at the above-mentioned exhibition, held in January, 1871, shows that, in class 1, of lots of twelve fleeces of ewes' wool, compared according to length, density, softness, fineness, elasticity, evenness of fleece, soundness, condition, and weight, the average weight of the lot taking the first prize of £10, was 4 pounds 1½ ounce; age of animal, two years; age of fleece, three hundred and eighty days. The average weight of fleece taking the second prize of £5, was 3 pounds 11 ounces. The heaviest lot exhibited in this class averaged 5 pounds 13⅜ ounces. In class 18, in a lot of five rams' fleeces in grease, taking a prize of £6, the average weight was 11 pounds 15⅕ ounces; age of the wool, three hundred and sixty-five days. In class 19, lots of twelve ewes' fleeces in grease, the prize of £6 was awarded to a lot averaging 8 pounds 6¾ ounces. These prize fleeces are included in the shipment to New York.

AUSTRALIAN PRAIRIE GRASS.—Mr. E. J. Vann, of Madison, Florida, states that, having received from a friend a few seeds of "Australian prairie grass," over a year ago, he commenced experimenting with the article, and afterwards distributed to planters interested in the subject of grasses. His investigations have convinced him that this particular variety is of very great value for that region. One planting will afford two crops, and, by plowing in in the fall, cropping may be continued indefinitely.

FARMERS' CLUB IN NORTH CAROLINA.—Mr. D. C. McMaders, secretary of the Spero club, at Salem Church, North Carolina, states that one of the members produced last year, on 18 acres of poor land, 650 bushels of corn; on one acre, 78 bushels; another, 530 bushels of Irish potatoes to the acre.

WHITE SCHONEN OATS IN GEORGIA.—Mr. John H. Dent, of Cave Springs, Georgia, says:

> Last year I received a pint of the White Schonen oats from the Agricultural Department, which yielded a half bushel, notwithstanding it was the most disastrous season for oats, for this section of country, experienced for many years. I shall sow the half bushel in February, and be enabled to give them a fair test for the year. The best oat we ever raised in this country is the Grazing oat; the Norway oats were a complete failure.

CONDITION OF LIVE-STOCK IN KANSAS.—Mr. J. M. Miller, Peabody, Marion county, says:

> The winter has been very severe; stock is suffering much in consequence. One

stock-farmer in Butler county lost between 25 and 50 per cent. on account of severe weather. This is the largest per cent. of loss I know of, though many have lost more.

INQUIRY CONCERNING JUTE.—Mr. W. H. Harris, of Red River Landing, Louisiana, states that last year he raised a small quantity of jute in his garden, saving the seed, and asks information as to the method of preparing the fiber for market. His inquiry is covered by the information given in the monthly report for October, 1871. Mr. Harris also writes that he has a cork oak twelve inches in diameter, grown from an acorn obtained from the Department before the war.

FRUIT AND SUGAR IN SOUTHEASTERN LOUISIANA.—Mr. F. E. Guedry, of Covington, Saint Tammany Parish, Louisiana, informs us that his section has a solid clay subsoil, which retains any fertilizer applied to the land, and that, while well adapted to any kind of grain, it is especially suited to fruit-growing. He adds that planters in that vicinity are cultivating sugar-cane to some extent, and, although the crop is comparatively a new one there, its success has been so great that many have invested in it largely.

MEXICAN WHITE FLINT CORN.—Mr. Joseph N. Brewer, of Lexington, Massachusetts, stating his experience with this variety, says that its quality was exceedingly good when used in the green state, and that when ripened it produced a very superior meal. After planting it for three years it seemed to degenerate, though he suspects that the seed used the last year was not carefully ripened, and that this may account for the apparent degeneration. On the whole, he is convinced that it is a valuable variety, deserving to be well tested in that latitude.

TREE-PLANTING IN KANSAS.—Mr. Percy Daniels, of Girard, Kansas, states that two years ago he put in about half an acre of European larch, Norway spruce, Scotch pine, and red cedar, but only a few plants came up, and these all died in from one to two weeks. He now thinks that good seed of the above descriptions, planted instead of young chestnuts, would be successful.

EXCELSIOR OATS IN OREGON.—Mr. William Phillips, of Clackamas, Clackamas County, Oregon, states that, having received last spring a small package of Excelsior oats, he sowed May 15th on fair soil, the resulting crop averaging 50 bushels per acre, by measure, the weight being considerably above standard. He also reports that some Maryland tobacco sown on hill land, after the middle of March, came up quickly, grew rapidly, and gave a product of excellent quality.

ARKANSAS LANDS.—Rev. A. R. Berrick, of Batesville, Arkansas, reports that some of the elevated, sandy uplands of that State are well suited for the production of fine tobacco, and that they can be bought at merely nominal prices. He himself possesses several hundred acres of this land, and finds it capable of producing 700 to 900 pounds of seed-cotton per acre, or 20 to 25 bushels of corn, or 10 to 12 bushels of wheat, per acre. It is also suited to apples, pears, peaches, and grapes.

AUTUMN IN SOUTHERN UTAH.—Mr. W. W. Hammond, of Toquerville, Utah, in a letter to the Department, dated December 8, 1871, writes that the past season was very hot and dry, stock finding very little grass on the hills, but that the fruit crops were generally good, meeting with a ready market in consequence of the development of the mining districts. More lately the weather was unusually cold, and considerable quantities of grapes were frozen before they could be picked, an

occurrence unparalleled since the settlement of that part of Utah, fifteen years ago.

THANET BARLEY IN WISCONSIN.—John A. Rice, M. D., of Merton, Waukesha County, Wisconsin, writes, that having received from the Department two pounds of Thanet barley, he sowed it April 21, on six square rods of light, clayey loam, not in the best condition of preparation. The barley grew remarkably fine and even, was harvested about the first of August, and on being thrashed turned out 113½ pounds of the finest grain ever grown in that region. He believes this variety to be a valuable acquisition to his locality, which is peculiarly adapted to barley. He devotes himself, however, more especially to growing corn, wheat, roots, and clover, feeding out almost all his crops to sheep, hogs, and cattle. Under this system his farm has increased most remarkably in fertility, so that where he cut 12 or 15 tons of hay at the time of taking possession of the property, he now cuts tenfold that amount, and the yield per acre of other crops has increased in nearly that proportion.

CHARGES OF TRANSPORTATION.—Mr. R. Emerys Jones, of Randolph Station, Dodge County, Wisconsin, writes that in that region the expenses of marketing absorb more than half the value of the farmer's products, and that the agricultural interest is suffering deplorably from this cause. He adds that the first cost of raising grain is about $7 per acre.

CORN AND WHEAT ON TWENTY ACRES.—Dr. George D. Pearcy, of Knightstown, Indiana, reports that in 1870, on twenty acres of dark, alluvial soil, thoroughly drained and deeply tilled, but unmanured, he obtained 1,200 bushels of corn, worth 50 cents per bushel. Value of pasturage after removal of the corn, $20; expenses of making the crop, including $120 interest on land, $246 75; profit, $373 25. He then sowed wheat on the same land, from which he obtained 400 bushels, July 5 and 6, 1872, worth $1 50 per bushel, and netting a profit of $300. Total profit on corn and wheat in fourteen months, $673 25, or $33 66 per acre.

Dr. Pearcy adds that, in preparing his seed-corn, he soaked it over night in blood-warm water, and in the morning poured off the water, and put one gill of kerosene to every bushel of the corn, stirring it in. He declares this method a sure preventive against loss of seed by birds; he also believes that it hastens germination and prevents ravages by cut-worms.

TOBACCO IN HENDERSON COUNTY, KENTUCKY.—In a recent communication to the Department, Mr. Alexander H. Major, of Henderson County, Kentucky, furnishes some information as to current practice in marketing tobacco in that county, which, as he claims, produces a larger quantity of the staple than any other in the State. The article there grown is a heavy, coarse, leafy variety, and the yield per acre, on strong land, frequently reaches 1,800 or 2,000 pounds. The tobacco is not packed by the farmer, but is put up by him in bundles, or "hands," classified as "good," "lugs," and "trash." The middle and larger top-leaves, when uninjured, constitute the good; similar leaves, slightly worm-eaten and defective, together with the extreme top leaves, constitute the lugs; the leaves near the ground, and others, which are ragged and torn, are designated trash. In a good crop, properly managed, the trash will be not far from 16 per cent., but no farm product shows the difference between the careful and the negligent grower as quickly as this

crop. These different terms do not by any means give a definite indication of quality; the producer merely exhibits his samples, and sells to the "stemmers" at the highest bid. The stemmers convert the good, lugs, and such of the trash as can be made available for the purpose, into strips, and export to Liverpool and London. The remainder of the trash is shipped to New York, New Orleans, &c., and sold under the name of lugs.

FRUIT SHIPMENTS AT COBDEN AND MAKANDA, ILLINOIS.—The following is a statement of the amount of fruit shipped at Cobden, on the Illinois Central Railroad, during the season of 1871:

Descriptions.	Amounts.	Descriptions.	Amounts.
Strawberries	11,242 bushels.	Peaches	88,081 bushels.
Gooseberries	16 bushels.	Apricots	134 bushels.
Cherries	310 bushels.	Pears	772 bushels.
Raspberries	962 bushels.	Apples	16,953 bushels.
Blackberries	308 bushels.	Grapes	32,430 pounds.
Plums	29 bushels.	Dried fruit	57,075 pounds.

There were also shipped 327 bushels of peach seeds; 2,633 bushels of tomatoes; 1,603 bushels of sweet potatoes, and 342 bushels of Irish potatoes.

At Makanda, on the same road, were shipped 130,000 pounds of strawberries, in May, and 22,110 pounds in June; 24,850 pounds of raspberries in June; 1,208,500 pounds of peaches in July, and 788,300 pounds in August.

THE UTAH AND NORTHERN RAILROAD.—A bill has been introduced into Congress to enable the Utah and Northern Railroad Company, incorporated under the laws of Utah, to extend its line by way of Bear River Valley, Soda Springs, Snake River Valley, and through Montana to the Northern Pacific Road. The bill grants right of way to the company to the extent of 100 feet in width on each side of the road, through the public lands traversed by it; also, at each station, an amount of land, not exceeding forty acres, for station buildings, workshops, &c. The company is authorized to raise by mortgage a sum not exceeding $15,000 per mile of the length of the road.

GEORGIA CORN IN EGYPT.—General Charles P. Stone, formerly of the United States Army, but now attached to the Egyptian war office, at Cairo, reports a very satisfactory cultivation of Georgia corn, the seed of which was received from this Department. It was not planted till the 20th of August last, thus losing eight days of the hot summer weather. It came up in four days, and, being well irrigated with Nile water, grew rapidly, reaching the height of 8 feet, and throwing out three or four shoots from each stalk. The ears were gathered at Christmas, full and ripe, but not so long as he expected to see them. The hills were shaded by orange trees, and hence the experiment did not succeed as well as it might have done.

AGRICULTURE IN ALABAMA.—Mr. James M. Moss, of Huntsville, in asking for fresh sorghum-seed, states that this kind of seed has run out in that neighborhood, and that it is no longer fit to plant. He says:

Times are very quiet here now, with more of a disposition to attend to business than at any time before; and quite a feeling is arising to improve farms and go into stock and mixed farming.

EXPERIMENTS WITH GRASS-SEEDS AND CORN.—Mr. Charles Wallace, Roseville, Franklin County, Arkansas, says:

In order to give you an idea of our soil and climate, I would state that on the 22d day of April last I sowed one acre in Hungarian grass-seed, which, by the 19th of June, was ripe enough to cut. I mowed it, broke up the ground and planted corn June 30th, and made 30 bushels sufficiently matured to save. Again, on the 15th of March, I sowed 4 acres of Norway oats, and cut a very heavy crop of it July 1. I then broke it up with single horses and planted it to corn July 12 and 13, harvesting full 30 bushels sufficiently matured to save. The fodder was pulled off of both pieces; the season was drier than any since the war, and the land upon which the experiment was made had been in cultivation for thirty-five years.

From your correspondent in Johnson County, I obtained a small quantity of Italian and perennial rye-grass seed; sowed them in separate beds "well prepared," March 14. They were both quite slow in germinating, being very much shaded, but in the latter part of May they commenced growing finely. By the middle of June both beds were thickly covered and were much admired by all who saw them.

Cotton has been raised to the exclusion of everything else in this section, and, as yet, no effort has been made to develop its agricultural resources. I have experimented considerably in the last few years, and have thus far succeeded in raising fair crops of everything planted.

HARD TIMES IN WISCONSIN.—Mr. R. E. Jones, Randolph Station, Dodge County, says:

The condition of the farmers is deplorable; it costs one-half of their produce to get it to market. For the last two years our crops in this State were not over 10 bushels per acre, and the whole county is overrun with wild oats.

GRASSES FOR THE SOUTH.—Mr. John F. Rollins, Fort George, Florida, in soliciting a supply of the seed of *Lespedeza striata*, or Japan clover-seed, says:

I have a large plantation, consisting of an entire sea island, and I am satisfied that many of the old fields now under cultivation would be much more profitable if planted in grass or clover and devoted to stock than under the present system of annual crops. What is true in my case is equally true all over the South. If the Agricultural Department can aid us in finding a plant that will take the place of the wild grasses and furnish forage for stock, a great work will be done.

FRUIT AND FERTILIZERS IN GEORGIA.—Mr. E. J. Purse, of Marlow, Georgia, has been experimenting with several varieties of the strawberry, viz: Agriculturist, Wilson's Albany Seedling, Triomphe de Gand, and Green Prolific. He finds the two first named well adapted to southern culture. Heat affects the berry much more than cold, the finest berries being found between March and July, and from October to the middle of December. Mr. Purse says:

I have a small farm and have succeeded very well in the manipulation of a fertilizer that is abundant and cheap; that is one part clay, one leaf-mold, and one swamp-muck, with a barrel of lime or land-plaster to the ton. When the leaf-mold is not procurable leaves will do as well. I use the cow-pen, stable, or night-soil, as the stimulant, by mixing with my standard as the plants need. Reserve the chicken-house for liquid applications.

FRUIT IN SOUTHERN ILLINOIS.—A letter addressed to the Department by a number of farmers of South Pass, Union County, states there were shipped during the late fruit season from that railroad station 11,242 bushels ofstrawberries, 16 gooseberries, 310 cherries, 962 raspberries, 308 blackberries, 29 plums, 88,081 peaches, 134 apricots, 772 pears, 16,953 apples, 2,633 tomatoes, 1,603 sweet-potatoes, 342 Irish potatoes, 200 onions, 32,430 pounds of grapes, and 57,075 of dried fruit. It is proposed to introduce tea-culture, among other industries.

SOIL AND CROPS IN NEBRASKA.—Mr. W. J. McIntyre, Ashland, Saunders County, says:

The soil here is rich vegetable loam, slightly intermixed with a very fine sand, and is of great depth and fertility. The surface of the country is rolling, with the best

natural drainage I ever saw. The uplands are wholly prairie, seemingly well adapted to the production of small grain of all kinds, or of corn. Spring-wheat has been the main wheat crop heretofore, but winter-wheat is beginning to be quite extensively sown. It seems to promise well so far.

ANGORA GOATS IN UTAH.—J. E. Johnson, editor of the Utah Pomologist, published at Saint George, has just formed a co-operative company, and negotiated for the importation of a herd of 130 Angora and Thibet goats. By a terrible storm they lost a number on the Union Pacific Railroad, but have finally succeeded in getting 108, which appear in good health. They intend crossing with the common goat, bringing up the quality to full-blood.

ALKALINE LANDS IN UTAH.—Mr. John Woodhouse, of Lehi City, Utah, writes that some of his heaviest crops are from land which, four years ago, was totally barren, in consequence of the alkali it contained. He states that the proper treatment of such soils is to plow in an abundance of coarse, half-rotted manure, and then flow water completely over the land, instead of around it. Generally, this will bring the land to in from two to five years, according to the proportion of alkali in the soil.

TREE-PLANTING IN KANSAS.—Mr. Riley M. Hoskinson, of Burlingame, Kansas, informs us that he now has on his prairie farm several thousand trees, planted by him and his family within the last five years, among which are oak, walnut, soft-maple, elm, white-ash, sycamore, catalpa, white and yellow willow, mulberry, and cottonwood. Many of his cottonwoods are now about thirty feet high and six inches in diameter.

A HARDY VARIETY OF OATS IN TEXAS.—Mr. George A. Smith, Belton, Bell County, Texas, says:

> We have a valuable oat here—the pea or rustless oat—that always succeeds and yields from 30 to 100 bushels to the acre; a great acquisition to the South, where the crop so often fails from rust.

WHEAT-SEED IN IOWA.—Mr. George Huston, Dodgeville, Des Moines County, says:

> A general infusion of new seed-wheat would be a great blessing to the State of Iowa. spring-wheat deteriorates more rapidly here than any other seed. The great reason for this consists in the fact that we never allow a piece of wheat to stand until it is fully ripe, and then save it for seed.

WHEAT EXPERIMENT IN MINNESOTA.—Mr. L. F. Pike, Owatonna, Steele County, last spring, sowed Red Australian spring-wheat, received from this Department, in drills about one foot apart, hoeing out the weeds. His effort was a failure, as was also those of a number of neighboring farmers. This variety is thought to be too late for that climate.

ORANGE GROVE.—A correspondent writes that H. J. Sanford, of Melonville, Orange County, Florida, is now setting out 125 acres in orange trees, which will be, in a year from now, the largest orange grove on this continent. He is also planting largely of other semi-tropical fruits.

PROGRESS OF STEAM CUTIVATION IN EUROPE.—At an agricultural meeting lately held in Scotland, Mr. Grey, of Aberdeen, gave some account of the progress of steam cultivation since 1855, in which year the late John Fowler started his first steam-plow in Essex, which was a very successful attempt. He subsequently expended $350,000 in experiments, but after a few years he had nothing to represent this amount of invested capital except a lot of old machinery. The solution of the

question whether plowing could be done cheaper with steam than with horses was decided in 1858; its importance may be learned from the fact that there are works in the country employing twelve hundred men in nothing else than making steam-plows. One farmer in Egypt employs four hundred steam-plows; he is also laying down four hundred miles of railway on his farm, principally to carry sugar-cane to his mills, and has ordered thirty locomotive-engines, and $3,000,000 worth of sugar machinery. This farmer is the Pacha. In Germany steam culture is making a revolution in agriculture. In England there are between 400 and 500 sets of tackle working for hire. These are held by companies as well as by private individuals; the investment has been found to be profitable.

A gentleman bought five hundred acres near London, that could not be rented at $3 per acre. He took down all the fences, drained the land, bought a steam-plow, and put all in grain crops. Last year his clear profits were $18,000 after allowing $10 per acre for rent. The soil is a stiff clay that cannot be cultivated profitably by horse-power. Another farmer bought five thousand acres of what was considered worthless clay land, and by steam-power stirred it 3 feet deep, producing crops last year nearly 7 feet high.

In Scotland steam cultivation is becoming quite general, producing astonishing results. Many of the farmers there have invested from $6,000 to $10,000 in steam machinery, and find that it pays better than horse-power. Joint-stock companies are also in existence that invest in land and steam machinery, and secure large dividends.

MARKET PRICES OF FARM PRODUCTS.

FOR FEBRUARY, 1872.

Articles.	Price.	Articles.	Price.
NEW YORK.		NEW YORK—Continued.	
Flour, superfine State..per bbl.	$5 75 to $6 10	Cheese, western dairy..per lb..	$0 12 to $0 15
extra State .....do....	6 45 to 7 25	State factory....do....	14 to 16
superfine western .do....	5 75 to 6 70	Cotton, ordinary to good ordinary .....per lb....	19¾ to 21¾
extra to choice western, per barrel.....	6 35 to 9 50	middling to good middling.....per lb....	22 5-6 to 24
extra southern...per bbl.	6 75 to 7 35	Tobacco,lugs,all grades..per lb..	7½ to 84
good to choice southern, per barrel.....	7 40 to 9 50	common leaf, all grades, per lb	8¼ to 10
Wheat, No. 1 spring..per bush..	1 56 to 1 58	Wool, Michigan .....per lb..	75 to —
No. 2 spring .....do....	1 50 to 1 54	Ohio .....do....	62 to 80
winter, red western do..	1 60 to 1 66	Texas.....do....	42 to —
amber, western...do....	1 65 to 1 72	California fall clip..do....	33 to 37½
white, western ...do....	1 65 to 1 78		
Rye .....do....	92 to 92½	BOSTON.	
Barley.....do....	84 to 87½		
Oats, ...do....	53½ to 55½	Flour, western, superfine per bbl.	5 70 to 5 75
Corn, new western, mixed..do....	73 to 74½	western extras ....do...	6 50 to 8 00
old western, mixed. .do....	— to — —	western choice .. .do...	8 50 to 10 00
Hay, shipping qualities per ton..	27 00 to 28 00	southern extras ...do...	6 75 to 7 00
prime .....do....	30 00 to 35 00	choice Baltimore ..do...	9 00 to 10 25
Pork, mess .....per bbl..	13 50 to 14 50	Wheat .....per bush..	1 60 to 1 65
prime .....do....	12 25 to — —	Rye .....do....	90 to 95
Beef, plain mess .....do....	9 00 to 11 00	Barley.....do....	75 to 1 10
extra mess.....do....	11 00 to 13 00	Corn, southern yellow,...do....	75 to 77
Lard, ...per lb..	9½ to 9¾	western mixed....do....	73 to 75
Butter, western .....do....	12 to 23	western yellow ...do....	75 to 77
State dairy .....do....	21 to 37		

Market prices of farm products—Continued.

Articles.	Price.		
BOSTON—Continued.			
Beef, mess.....per bbl..	$10 00	to	$12 00
extra.....do....	12 00	to	13 00
Pork, prime.....do....	12 00	to	13 00
mess.....do....	14 75	to	15 00
Lard.....per lb..	9½	to	10
Butter, N. Y. and Vt.....do....	20	to	35
Canada choice....do....	27	to	30
western.....do....	17	to	29
Cheese, N. Y. and Vt. choice factory.....per lb...	12	to	16
Ohio factory.....do....	11	to	15
Hay.....per ton....	30 00	to	34 00
Tobacco, choice.....per lb....	12	to	14
good western...do....	11	to	—
common to medium.do.	10	to	11
Wool, Ohio and Penn...per lb..	65	to	80
Michigan.....do....	65	to	75
other western.....do....	60	to	74
California.....do....	30	to	55
Texas.....do....	30	to	50
PHILADELPHIA.			
Flour, superfine.....per bbl..	5 00	to	5 75
extras.....do....	5 75	to	6 50
family & fancy brands.do.	7 25	to	10 00
Wheat, Penn. and western— red....per bush.	1 55	to	1 60
amber.....do....	1 62	to	1 66
white.....do....	1 70	to	1 75
Rye.....do....	92	to	—
Corn, yellow.....do....	65	to	68
mixed western.....do....	69	to	70
Oats, white western.....do....	55	to	56
Pork, mess.....per bbl..	14 00	to	14 75
Beef, mess extra, city-packed, per bbl.....	14 75	to	— —
Lard.....per lb..	9¼	to	9¾
Hay, prime.....per ton..	32 00	to	34 00
mixed.....do....	24 00	to	26 00
Butter, choice roll.....per lb..	23	to	25
choice tub, fresh.do....	20	to	25
Cheese, N. Y. factory.....do....	14	to	15
N. Y. dairy.....do....	15	to	16½
Woool, picklock.....do....	80	to	85
extras.....do....	74	to	76
medium and coarse.do.	75	to	80
BALTIMORE.			
Flour, superfine.....per bbl.	6 00	to	6 50
extras.....do....	6 75	to	7 50
family.....do....	7 50	to	8 00
Wheat, Pennsylvania...per bush	1 57	to	1 67
western.....do....	1 82	to	— —
southern.....do....	1 64	to	1 77
Rye.....do....	1 00	to	— —
Corn, yellow.....do....	67	to	70
white.....do....	66	to	68
Oats.....do....	54	to	57
Hay, western.....per ton..	— —	to	— —
Penn. and Maryland.do....	25 00	to	27 00
Pork, mess.....per bbl..	14 50	to	15 00
Butter, western, prime to choice.....per lb..	23	to	25
New York.....do....	30	to	37
Cheese, western factory...do....	14	to	15
eastern factory..do....	15½	to	16
Lard.....do....	9½	to	11½
Cotton, ordinary to good ordinary.....per lb..	—	to	20½
low middling to middling.....per lb..	21½	to	22
Tobacco, common to good lugs, per lb.....	7	to	8 2½
common to medium leaf.....per lb..	8	to	9¼
Wool, unwashed, free from burrs.....per lb..	44	to	46
tub-washed.....do....	68	to	70

Articles.	Price.		
CINCINNATI.			
Flour, superfine.....per bbl..	$6 00	to	$6 25
extra.....do....	7 00	to	7 50
family.....do....	7 15	to	7 35
Wheat, No. 1 white...per bush..	1 60	to	1 65
No. 2 white.....do....	1 55	to	1 60
No. 1 red.....do....	1 55	to	1 57
No. 2 red.....do....	1 52	to	1 54
Corn, white.....do....	50	to	51
yellow.....do....	—	to	—
Oats, white.....do....	44	to	45
mixed.....do....	41	to	43
Barley, winter, No. 2.....do....	70	to	80
spring, No. 2.....do....	70	to	80
Hay, tight-pressed, common to choice.....per ton..	14 00	to	21 00
loose-pressed, prime to choice.....per ton..	17 00	to	21 00
Pork, mess.....per bbl..	13 25	to	— —
prime.....do....	— —	to	— —
Beef, plate.....do....	12 50	to	— —
hams.....do....	26 00	to	28 00
Lard, prime steam.....per lb..	8⅞	to	9
Butter, western reserve...do....	23	to	25
choice cent'l Ohio.do....	20	to	22
Cheese, western reserve..do....	—	to	—
choice factory....do....	15	to	16
Tobacco, lugs, all grades..do....	7	to	18
leaf....do.....do....	8	to	30
Cotton, low ordinary to good ordinary.....per lb..	—	to	21
low middling to good middling.....per lb..	21½	to	23
Wool, tub-washed.....do....	70	to	75
fleece-washed, manufacturing.....per lb..	50	to	55
fleece-washed, combing, per lb....	52	to	55
unwashed, manuf'g.do....	42	to	45
unwashed, comb'g.do....	42	to	45
pulled.....do....	60	to	62
CHICAGO.			
Flour, winter extras...per bbl..	8 25	to	8 50
spring extras.....do....	6 12½	to	7 00
Wheat, No. 1 spring..per bush..	1 23½	to	1 29
No. 2 spring.....do....	1 23½	to	1 23⅝
No. 3 spring.....do....	1 13½	to	1 14
Corn, No. 2.....do....	40 13-16	to	41⅛
rejected.....do....	37	to	37½
Oats, No 2.....do....	32½	to	32½
rejected.....do....	29	to	—
Rye, No. 2.....do....	68½	to	69
Barley, No. 2.....do....	60½	to	—
Hay, timothy (on track).per ton.	12 00	to	15 00
prairie.....do....	9 00	to	11 00
Pork, mess.....per bbl..	12 70	to	13 40
extra.....do....	— —	to	— —
Beef, mess.....do....	8 00	to	10 00
Lard.....per lb..	8¼	to	9½
Butter, choice dairy.....do....	22	to	25
fair to good tub and firkin.....per lb..	13	to	16
Cheese, New York factory.do....	15	to	—
western, factory...do....	12	to	13
Ohio, factory.....do....	13	to	—
Wool, medium fleece.....do....	58	to	62
unwashed medium.do....	38	to	43
tub-washed.....do....	50	to	76
NEW ORLEANS.			
Flour, superfine.....per bbl..	6 75	to	7 00
extras, (according to grade).....per bbl..	7 25	to	9 75
Corn, white.....per bush..	85	to	90
yellow.....do....	—	to	—
mixed.....do....	83	to	85
Oats.....do....	63	to	63
Hay, choice.....per ton..	28 00	to	30 00

Market prices of farm products—Continued.

Articles.	Price.	Articles.	Price.
NEW ORLEANS—Continued.		ST. LOUIS—Continued.	
Hay, prime ..... per ton	$27 00 to $28 00	Lard, prime steam ..... per lb	$0 8⅞ to —
Pork, mess ..... per bbl	15 50 to 15 87½	kettle ..... do	8¼ to —
Beef, mess, (Texas) ..... do	— — to — —	Butter, choice ..... do	22 to $0 33
Lard, tierce ..... per lb	9½ to 10	medium to fair ..... do	12 to 17
keg ..... do	10¼ to 10½	Cheese, choice factory ..... do	14½ to 15
Butter, choice western ..... do	22 to 25	Cotton, middling ..... do	21⅞ to —
Goshen ..... do	32 to 34	Tobacco, lugs ..... per cwt	5 60 to 5 90
Cheese, choice factory ..... do	14 to 15	common leaf ..... do	— — to — —
western reserve ..... do	13 to 13½	medium to good leaf, per cwt	— — to — —
New York cream ..... do	17 to —	Wool, tub-washed ..... per lb	78 to 79
Cotton, ordinary to good ordinary ..... per lb	19½ to 20⅞	fleece-washed ..... do	— to —
middling to good middling ..... per lb	22 to 22⅞	unwashed medium ..... do	46 to 49
Tobacco, lugs ..... do	7½ to 8	SAN FRANCISCO.	
low leaf ..... do	8½ to 9		
medium leaf ..... do	9½ to 10	Flour, superfine ..... per bbl	5 50 to 5 75
ST. LOUIS.		extra super ..... do	5 87½ to 6 00
		higher grades ..... do	6 25 to 6 50
Flour, superfine ..... per bbl	5 50 to — —	Wheat, State ..... per cental	2 05 to 2 15
extras ..... do	6 00 to 6 75	Oregon ..... do	2 10 to 2 15
choice ..... do	7 50 to 8 00	Corn, white ..... do	1 50 to — —
Wheat, red ..... per bush	1 57½ to 1 60	yellow ..... do	1 50 to — —
white ..... do	1 58 to — —	Hay, State ..... per ton	22 00 to — —
spring ..... do	1 27 to 1 30	Pork, mess ..... per bbl	18 50 to 22 00
Corn, mixed ..... do	38 to 55	prime ..... do	17 00 to 18 00
yellow ..... do	— to —	Beef, mess ..... do	13 00 to 14 00
white ..... do	55 to —	Lard ..... per lb	11½ to 13
Oats, white ..... do	37½ to 45	Butter, overland ..... do	20 to 25
mixed ..... do	42 to 43	California ..... do	25 to 32½
Rye ..... do	77½ to —	Oregon ..... do	15 to 20
Barley, winter ..... do	70 to 85	Cheese ..... do	15 to 17
Hay ..... per ton	15 00 to 19 00	Wool, native ..... do	— to 20
Pork, mess ..... per bbl	13 25 to — —	California ..... do	22½ to 30
		Oregon ..... do	28 to 30

[The publication of the meteorological tables in the monthly is from this date discontinued, by direction of the Commissioner of Agriculture.]

MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

MARCH AND APRIL, 1872.

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1872.

MONTHLY REPORT.

DEPARTMENT OF AGRICULTURE,
Statistical Division, April 26, 1872.

SIR: I submit herewith, for publication, a digest of the reports of our statistical corps, relative to the condition of winter-wheat and other cereals, the condition of farm animals, and the comparative prevalence of disease among them during the past year, with a communication giving an account of the progress of the beet-root sugar manufacture in Sweden, and records of the operations of the several Divisions of the Department.

J. R. DODGE, *Statistician.*

Hon. FREDERICK WATTS,
Commissioner.

CONDITION OF WINTER GRAIN.

The low temperature of the month of March, and the accumulations of winter snow and ice, have retarded the springing of vegetable life, and tinged with gloom the views of local reporters. Over a large area, at the date of returns, snow still covered deeply the grain-fields, and only conjecture, founded on the forwardness and vigor of plants at the opening of winter, and on the mechanical condition of the soil and the severity of the season, could point to the probable *status* of the winter grain. The general tenor of reports carries the idea, not of sweeping destruction by freezing, but of injury by thinning out, by killing in spots and patches, and especially by retarding an early start and vigorous growth. In many cases the plants, apparently dead, were only sleeping, unpromising in appearance but firmly rooted, and ready, with favoring warmth and sunshine, to start into sure and steady if not rapid growth. Where the fields were drained, the soil deep and mellow, the casualties of winter have been unknown; where the seeding was done with the drill, on land having any fair degree of suitable preparation, almost absolute immunity from loss by freezing has been secured. It is strange that the use of the drill has not become universal. The fact remains that nearly all the wheat of the Eastern States, almost all in the South, much in the Middle States, and no little in all portions of the Western, is seeded by hand. The use of drills enough to supersede all the broadcast sowing of the country would secure in a single year increased yield sufficient to pay for them.

The April returns, as a whole, indicate stunted appearance, retarded growth, and rather more than an average amount of destruction by winter-killing, but a sound condition of the roots of plants in suitable soil or that covered uniformly with snow, which with favoring weather may

secure a vigorous growth and a good yield. The droughts of summer always interfere, in a larger or smaller portion of the wheat area, with the proper time for seeding; those of last season were only a little more extended and severe than usual. Our climate is peculiarly subject to them, and this fact should enforce the more general draining, deepening, and mellowing of the surface soil, which alone, in the experience of the past, as reported each spring from almost every county in the country, would suffice to insure against the worst effects of drought upon our winter grain.

In Maine the ground was deeply covered with snow; but it was believed that the plants were safe. In Aroostook County an interest in winter grain is arising, as the result of a few good crops of winter-wheat last year. The snow was deep in New Hampshire on the 1st of April; the earth frozen, in the locality of our Hillsborough correspondent, "to the depth of seven feet." The small area reported in Vermont was generally promising when last seen in the autumn. In Massachusetts some reports of winter-killing are received. The few fields of wheat near Providence, Rhode Island, are flourishing; but rye is injured by freezing, the ground having been bare most of the winter; and rye in Kent County has been roughly treated by the winter winds of February and March, which have been unusually high. In Connecticut there has been much bare surface and severe weather, and the rye-fields present a somewhat unpropitious appearance. The reports are more favorable from Hartford than from Fairfield, Windham, and New London.

The reports from New York in the early part of the month were not very cheerful in tone, the snow and ice not having disappeared, but indicated a probable improvement, under the influences of fine weather, the plants being generally alive. A few extracts from correspondence will illustrate these points:

Niagara: Very poor; so dry last fall that but little growth was made except on the best prepared land. *Dutchess:* Look badly now; little snow. *Genesee:* The wheat was small when winter commenced, and has been uncovered most of the time; the top looks dead, but there is probably vitality enough in the roots to give a fair promise with favorable weather. *Chenango:* Below average; little protection from snow. *Sullivan:* Scarcely any winter-wheat; rye looks very bad; little snow to cover it. *Yates:* Wheat-fields are very bare now, but the roots seem to be generally alive. The fall was extremely dry, so that it got a poor start, and there has been no snow to protect it. *Seneca:* Never looked worse; top entirely dead. *Monroe:* Looks poor; cold winter and little snow. *Jefferson:* The ground was frozen hard in December, and afterward a partial thaw settled the snow down into a hard icy crust, which has since remained on the ground; hence the prospect is not very promising. *Erie:* Small on account of drought in the fall. *Albany:* Rather poor, having been exposed for three months to searching winds; but the hardest time is yet to come from freezing and thawing. *Chautauqua:* Badly frozen; and looks bleached, owing to cold winds without much snow. *Onondaga:* Wheat got a light growth in the fall, and has been mostly covered with snow since. *Steuben:* Severe cold and little snow has been hard on wheat and rye; the Fultz wheat looks better than any other, and promises to be an acquisition. *Washington:* Ground frozen more than two feet deep, and has been solidly frozen all winter; now covered with snow. *Livingston:* Wheat not looking well; steady cold with little snow; the ground frozen very deep. *Greene:* Looks rather poor. The ground has not been covered with snow a whole week during the entire winter; the coldest weather was in March, accompanied with high north

winds. *Queens:* Under snow; the river still frozen one foot thick, and used as a highway; good sleighing in some parts of the county. *Oneida:* Winter grains are now covered by one to two feet of snow, and the winter has been steadily cold. *Ontario:* Poorest condition known for thirty years, owing to absence of snow and freezing and thawing. *Ulster:* No snow; but the ground frozen four feet deep, with an occasional surface thaw. *Schuyler:* Very bad; the ground was very dry last fall, so that the plants got a poor start, and the winds blew the earth from the roots, there being little snow to protect them. There was but one fall of snow of over six inches in depth, and that remained upon the ground only four days. *Rensselaer:* Wheat, rye, clover, and timothy all appear to be dead, though we hope it may turn out better than that. It has been the hardest winter for seventy years. One-third of the potatoes frozen, and two-thirds of the bees dead. The heaviest teams crossed the river at Albany, the ice being three feet thick. Ground frozen from three and a half to five feet deep.

Most of the New Jersey returns represent the ground poorly covered with snow, while the temperature was low and the soil deeply frozen. In Morris County winter-grain was "much injured by freezing and thawing;" in Burlington "few fields have an average appearance, while many look worse than for seven years past;" in Cumberland the "plants had a good start in the fall, are well rooted, but as yet look bad;" in Camden "winter commenced in November, with very high winds, which seemed to kill the tops of the grain, and there was but little snow to protect it, so that little evidence of vitality appears, except in protected situations or fields early sown;" in Hunterdon, as the result of freezing, "many farmers contemplate plowing their fields for corn and oats when the weather permits;" in Union, where the ground was reported to be frozen to the depth of 30 inches at the date of the report, the appearance of wheat and rye fields is bad; and similar reports come from Hudson and Essex, where high winds have prevailed, with little snow. The fly has been busy in Warren and Burlington. The latter report says: "I have frequently found as many as four in a single stalk. Of course here, as elsewhere, the fly does most harm where neither the soil nor farmer supply the plant with the food necessary for vigorous growth. Much of the soil in the wheat-growing portion of our county is of that texture which best withstands the effects of a winter like that just past, (will not blow when dry; will not run when freezing and thawing,) and a favorable spring may yet give us a crop on this soil. Rye is grown on our lightest soil, and will bear a higher mark than wheat."

The reports from Pennsylvania refer to the severity of the winter and the depth of freezing; in some cases 2½ feet, in others 4 feet, at the date of mailing. There was "constant freezing from November 23 to April 1" in Cambria, and "fields that were green in fall are now bare;" "fields look as if scorched by fire" in Westmoreland; fields are injured by the fly and by frost in Lancaster; winter-wheat in Dauphin "has the appearance of having been frozen off, as the stem in many places can be lifted from the roots;" small growth was made in the fall in Bradford; looks poor in Cumberland, "but roots are living and commencing to grow;" much winter-killed in Mifflin, where a very large crop was grown last year, half of it the Fultz variety. Similar reports come from Wayne, York, Perry, Clinton, Chester, Tioga, Bucks, Indiana, Elk, Beaver, Susquehanna, Greene, Armstrong, Lawrence, Lycoming, Huntingdon, Mercer, Wyoming, Adams, Warren, Northumberland, Washington, and Lehigh. The fly is reported in several counties.

Lack of winter protection caused severe injury in Delaware.

South of Maryland and Virginia little wheat is grown, and rye mainly for winter pastures. A selection from returns will represent the condition of winter grain:

MARYLAND.—*Queen Anne:* The winter has been very hard on wheat, the growing season of last fall having ceased on the 1st of December. Fertilizers were very extensively used, and wheat seeded on or before October 10, with a liberal supply of fertilizer, and on properly drained land, has made a rapid improvement within the last few days, and now looks quite promising. When ground was not properly drained, or wheat seeded late, it still presents a poor appearance. It may not, however, be so badly hurt as its present apparent condition would seem to indicate, as the season is very backward, and the best wheat is no further advanced than it should have been by March 1st after passing through an ordinary winter. I will add that the Fultz wheat you sent me has wintered well and promises to be a valuable acquisition. *Washington:* Wheat has looked badly, owing to dry fall and severe winter, but is improving rapidly now. The Fultz wheat received from the Department last fall, although sown late, looks remarkably well. Considerable has been sown from seed procured in Pennsylvania, and generally looks much better than other varieties. *Harford:* Looks worse than for many years; fly last fall and winter-killed. *Cecil:* Many fields ruined by fly last fall, and very severe winter; little snow. *Carroll:* Very unfavorable. Early-sown grain suffered from Hessian fly, while dry weather and the severe winter have bleached the plant. *Talbot:* Wheat looking badly. Fly in the fall and frost in winter.

VIRGINIA:—*King and Queen:* I never saw wheat or rye in worse condition. These crops, as well as oats, have so diminished in product as to render the return of seed doubtful. There were many instances last year of a product less than the amount of seed sown, and the present crop promises no better. *Highland:* Looks very badly, showing only dead blades above ground. *Henry:* The winter has been unusually severe and there has been more snow in March than ever before known. Wheat-fields look naked, but the roots appear sound and the plants healthy. *Washington:* Wheat worse than for many years. Dry weather all the fall, and from December to March. *Chesterfield:* Backward, but a remarkably good stand. The Fultz wheat received from the Department last fall was seeded with great care and promises well. *Craig:* Freezing has continued to within a few days. *Henrico:* Remarkably fine. Fall late and wet enough to give a good start. *Bath:* Injured by hard freezing and so small an amount of snow in early winter. *Culpeper:* Fields look bare and unpromising from freezing and thawing in March. My Touzelle wheat received from the Agricultural Department three years ago looks about twenty per cent. better than the Fultz, California, or Lancaster, sown at the same time and under equally favorable circumstances. The Scotch rye sent from the Department last fall also looks very well. *Fluvanna:* Looks backward, but is not winter-killed, having been protected by continued snows. *Frederick:* Wheat better than average, scarcely winter-killed at all, but the present cold, dry weather is unfavorable. *Gloucester:* Generally looking badly: that late sown much frozen. *Rockbridge:* Looks better now than in January and February. The snows of March seem to have infused new life into it and a fair crop is promised. *Montgomery:* Wheat below an average in appearance, especially late sown; but it is not winter-killed and may make a good crop. *Rockingham:* Looks well; the dry state of the ground prevented much injury from frost. *Louisa:* No rye raised.

Wheat does not look well; was sown early and had a good start, but the winter has been very severe. *Greenville:* Below average. Severe winter and little snow. *Prince George:* Wheat sown broadcast, especially on clay soil, is much winter-killed, but drilled wheat looks strong and healthy. Little or no rye. *Mecklenburgh:* Far above last year. More snow and ice than almost ever known before, which have protected the wheat. *Campbell:* Looks well, considering the cold and lack of snow early in the winter, but is not as promising now as at first of the year. *Buckingham:* Although there was more snow than for many years past the wheat is looking badly. After it had been covered for several weeks there was a sudden thaw, followed by intense cold, which killed much of it and left the rest exposed. The Fultz wheat received from the Department last fall has proved much more hardy than other varieties, and promises a good yield.

North Carolina.—*Granville:* Much injured by freezing and thawing, with little protection from snow. *Mecklenburgh:* Early-sown looks well; late, poor. *Catawba:* Looks well in spite of severe winter, owing to fine fall growth. *Rockingham:* Looks well; much snow. *Rowan:* Very backward, but a good stand. *Beaufort:* Good; much snow. *Currituck:* Much thrown out. *Wilkes:* Looks dead, but roots seem alive. *Gaston:* Thin stand, from freezing out, but looks well. *Warren:* Unpromising; unfavorable fall. *McDowell:* Owing to late and open fall, it had a good start; looks well. *Orange:* Very bad; much frozen out, especially on red land. *Hertford:* Very unpromising; wet, cold winter. *Stanley:* Winter wheat and rye are in average condition. The stand is good, and if no late disasters cut it off, a fair crop may be looked for. Our early red wheat is, in truth, too far advanced in sunny positions, when late frosts may damage it. The Tappahannock, introduced some years ago by the Department, though not equal to what it was at first, presents a thrifty aspect; its large tussock and broad blades cover the ground all over with a dark, green carpet. Of the Fultz wheat sent last fall it is reported that, so far, "there is nothing remarkable about it, unless it be its slender growth."

Of fifty-five counties reporting wheat, accounts are favorable from thirty, unfavorable from twenty, while twenty-five return "average condition."

South Carolina.—*Anderson:* Wheat late, but healthy; much winter-killed. Eight snows, the last eight inches deep; deepest for many years. *Richland:* Fine; no freezing out, owing to the moist state of the ground during the extremely cold weather. *Union:* Wheat good when sown before November 15; late-sown wheat, small. *Marion:* Early-sown wheat looking well; the Fultz wheat promising. Schonen oats and Scotch rye have not stood the winter well. A large area has been sown in oats and the prospect is good. It is now considered the safest and most economical grain and forage crop that can be raised in the county. *Lexington:* Winter wheat is somewhat backward, and the stand not very good, owing, doubtless, to the late sowing and very cold winter. Wheat sown here on the 1st of October, and moderately fertilized, would almost invariably reward the laborer abundantly; but cotton-seed is generally used for manure, and therefore farmers wait until the last of November, and even later, in order to prevent its sprouting, and thus injuring its fertilizing properties. Besides, the cotton-picking demands the attention of their entire force until about that time, and therefore the wheat crop is generally sown from one to two months too late to produce the best results. The correspondent says: "My own wheat sown in the middle of November, and manured with cotton-seed and Wando

phosphate, looks remarkably well, and bids fair to yield a first-rate crop. This is perhaps partly owing to the seed, it being of the Tappahannock variety, and raised in Missouri, which will be likely to result in its maturing from ten to fourteen days earlier than from seed raised in this locality. The Fultz wheat sent me by the Department is also looking remarkably well, and will apparently sustain the reputation it has acquired in the North. I have some small patches of rye, which look well, though used for pasturage all winter, and will doubtless yield well."

GEORGIA.—*Hall:* Good stand, but very backward. Snow six inches deep March 22. Never known before. *White:* Little wheat sown; much more rye; looks well. *Walker:* Wheat smaller than ever before at same date, but stands good. Rye, average. *Newton:* Backward; winter oats somewhat winter-killed. *Marion:* Wheat not looking well, on account of the extremely cold, wet weather; rye looks well; the Fultz wheat from the Department looks well, but the Scotch rye seems to be a failure. *Gilmer:* Looks well; severe winter, but protected by much snow. *Wilkes:* Wheat in good condition; the Fultz wheat looks best. *Heard:* Wheat backward, but fair. *Cherokee:* Very backward; in some places frozen out until too thin. *Fannin:* Wheat looks 50 per cent. below an average; rye also 20 per cent. below; the Fultz wheat looks better than any other kind; Scotch rye did not germinate. *Dawson:* Generally bad; but where early sown looks well; little rye sown.

In Georgia eight counties report superior condition, twenty-eight a good prospect, two an average, and fifteen an unpromising appearance.

FLORIDA.—*Wakulla:* The correspondent says: "The past winter will be remembered in Florida. I have felt colder weather here, but through January and February it was almost uninterruptedly cold, which is unusual here. The planters commenced planting corn the last of February, but, by reason of the superabundance of wet and cold, the stands are not good and the crops are looking badly.

ALABAMA.—*Lauderdale.* Very promising. Great pains taken in seeding. *Livingston.* Not very promising; much frozen out and sustained only by the fibrous roots still retaining their hold. *Blount.* Much snow, and it looks fine. *Macon.* Large crops of wheat, rye, and oats sown, and look well.

MISSISSIPPI.—*Amite.* Wheat a failure as usual, and red oats a perfect success—entirely rust-proof. *Wayne.* No wheat grown. Rye and oats fine. Attention turned to winter-oats, which do well. Red rust-proof oats a favorite.

Indications of increased attention to cereals appear in Texas, pointing to an enlarged area to be harvested this season. The fields are generally promising. A good account is given of the appearance of the Tappahannock and Fultz varieties. In Cherokee County the condition of the latter, as well as Scotch rye, is 50 per cent. better than other kinds. Abundant rains, causing vigorous growth, are reported from Kendall. Wheat promises to be ripe in Ellis by May 10. A backward condition is reported from Independence, Columbia, and Blanco. Increase of acreage is especially marked in Grayson, Kendall, Lampasas, and Johnson.

The appearance of wheat is generally unpromising in Arkansas. It is not a prominent interest and few counties are reported.

In Tennessee the early-sown wheat is generally in vigorous growth, while much that was sown in October and November was killed or injured by freezing. Careless preparation of the soil is given as another cause for unpromising condition in many places. That which appeared to be frozen out is generally improving rapidly. In Bradley County

the early and the late-sown are looking well, while that seeded in October is winter-killed. In Robertson, Fultz wheat, sown October 27, makes a fine show. The poor appearance of late-sown grains is marked in Meigs, Roane, Lincoln, Madison, and Jefferson.

The accounts from Kentucky are quite various—some promising, others gloomy. A fall drought prevented sufficiently early sowing. In some places where a good stand appears, the severity of the weather has prevented early and rank growth. Several counties compare the prospect favorably with that of last spring, and several present unqualified assertions of fine condition. On the whole, the average appearance is indicative of a fair crop.

Severe freezing and backward condition are reported from West Virginia. There is nothing to indicate an exceptionably poor crop.

A few quite unfavorable reports come from Ohio. Our Franklin correspondent had not seen a green field, and says there has not been rain enough in thirty-six months "to run in a furrow." Alternate freezing and thawing in March, in the flat lands of the northwestern part of the State, have wrought much injury. The appearance of fields is "very poor" in Putnam and Defiance; "much worse than usual" in Medina; "miserable" in Franklin; "worse than for many years" in Lawrence; "much worse than usual" in Medina; and "the poorest ever known" in Jackson. In several counties indications of improvement are reported, and many others make no complaint of injury. With good weather, a fair crop may be expected. Of forty-nine counties reporting wheat, forty-one represent a comparatively unpromising condition.

Nearly all Michigan correspondents report rather an unpromising appearance of winter-grain, or the fact that the ground was frozen and deeply covered with snow. Manistee is the only county claiming an unqualifiedly "good" appearance of all winter cereals.

The condition of winter-grain is included in reports from fifty-six counties in Indiana, of which thirty-nine are below an average. The counties making the most favorable returns are Warrick, Wayne, Floyd, Knox, Clay, Clinton, Carroll, Pike, Scott, Fountain, White, Bartholomew, and Boone. The superior condition of drilled wheat is general. The Decatur correspondent says, but little wheat is discernible except that sown upon clover-sod broken in the summer and rebroken in September. Results of the season remarkably demonstrate the superiority of the drilling.

Returns from fifty-eight counties in Illinois indicate a condition below an average in twenty-six counties; the remainder show either an average or a superior condition. In Fayette the plant is more vigorous than usual; in Morgan it is fine on drilled land; "better than for several years" in Lawrence; "better than ever" in Saint Clair; in Madison, "excellent, never better." In some of the more southern counties the warm weather was having a favorable influence.

Of seventy-six counties reporting in Missouri, forty-nine present comparatively unfavorable returns, four only superior condition, twelve good appearance, while the remainder are equivalent to an average. In De Kalb, "broadcast wheat is mostly winter-killed, while drilled promises well;" in Grundy, where most farmers plow but once and carelessly brush in their seed, wheat is killed; in Marion, drilled wheat is saved from the destruction attending that sown broadcast.

Little winter-wheat is produced in Wisconsin, Minnesota, Iowa, or Nebraska. In Wisconsin but ten counties mention it, of which two return good condition, four average, one poor. Of nine in Minnesota,

three report good or excellent, six unpromising. Houston makes the best return. Of twenty-seven in Iowa, eight make a favorable report, four medium, fifteen unfavorable. The counties making best returns are Benton, Jefferson, Mahaska, and Greene. In Nebraska, four counties report a good appearance, eight lower than average. In Cuming, "wheat is very promising, and it looks well in Burt, Madison, and Hall." In Kansas, twenty-five counties report wheat "badly injured," or "frozen out;" fifteen "poor," or equivalent terms; rye appears better, but is not much grown.

Returns from the Pacific coast are nearly all favorable, both in California and Oregon. In Stanislaus County, California it "never looked better;" "very promising" in Tuolumne; "A No. 1" in Monterey; and elsewhere favorable accounts are given. From Oregon there is not an unfavorable report; the crop is represented to be fine in the counties of Benton, Tillamook, Polk, Clatsop, Yam Hill, Clackamas, Lane, Linn, Curry, Grant, Columbia, Douglass, and Umatilla.

CONDITION OF FARM ANIMALS.

Horses and mules, the most valuable class of domestic animals, receive more uniformly the requisite care and protection than other stock. If hay is scarce the deficiency is usually made good by extra supplies of grain; and yet the colts and young horses of thinly settled States are often left to the same chances, for pasturage and shelter from the rigors of winter, that are enjoyed by the less valuable stock of the range. With the exception of suffering from the severity of the past winter among this class of unstabled horses, mainly in the milder climates of the country, both horses and mules are reported to be in average condition.

While pecuniary considerations appear to govern the action of farmers in the care of the dumb brutes committed to their protection, it is hoped that no respectable stock-grower will disregard the common dictates of humanity in his treatment of his dependents. A close view of the subject will show that its monetary and humanitarian aspects are usually in harmony; and a man who is a man indeed will be willing to make some pecuniary sacrifice, in emergencies, rather than subject his farm-stock to avoidable suffering. The terrible loss of brute lives by the winter's severity, as recently experienced in Texas, in Kansas and Nebraska, and in Colorado and Wyoming, should be avoided, as far as practicable, by better provision for scarcity of feed, resulting from drought, deep snows, and other causes, and by greater care in providing stock with shelter, either natural or artificial.

CONDITION OF CATTLE.

The short hay crop of last year, and the severity of the past winter, have taxed the feeding resources of Maine farmers to the utmost. The numbers were reduced as much as possible in the autumn, an unusual quantity of grain has been fed, and yet many have died. The deficient supply has not been made good. In York "a large proportion are in fair condition, but some persons are short of hay, and choose to stint their stock rather than buy;" in Franklin, cattle are in good order,

"more corn having been fed than in ten years;" in Piscataquis they have been kept in condition by feeding grain, with a prospect of feeding more, three feet of snow still covering the ground. In Cumberland, Waldo, Sagadahoc, and Hancock, (where some have actually starved to death,) cattle are in poor flesh.

New Hampshire reports of condition are uniformly favorable, except in Coos, which reports "rather thin, but healthy." In Hillsborough superior condition has resulted from better care and feeding of grain.

Similar accounts are received from Vermont; the least favorable from Addison, Windsor, and Orange. In some sections the low price of beef induced farmers to attempt to keep over too much stock. In Grand Isle and Windham animals are in fine flesh.

Dukes and Norfolk, Massachusetts, are the only counties in that State representing cattle in condition lower than average; Franklin and Hampden, better; the other counties about an average.

"Condition never better," in Bristol, Rhode Island; "poorer than last year by 10 to 30 per cent.," in Washington; "poor, but healthy," in Providence.

Only Middlesex and New London, in Connecticut, report "below an average," from scarcity of hay, which is $40 per ton in the latter. Returns are generally quite favorable.

Reports from thirty-six counties in New York represent condition from "average" to "excellent," (in Niagara,) and "never better," (in Saratoga;) below an average in Otsego, Sullivan, Warren, (hay $20 to $30 per ton.) Ontario, Rensselaer, and Suffolk. In Onondaga there is some complaint of cows not doing well when "coming in." Cattle will have been stabled six months in Genesee by the 10th of May, the assumed time of turning out.

In eighteen counties heard from in New Jersey the condition is generally reported as "good." The correspondent writing from Sussex County states: "The condition of cattle very fair generally. The hay crop being very short, most farmers sowed corn broadcast, which, with straw, will make good the deficiency." In Cumberland, Salem, and Cape May Counties the condition is reported as "poor," owing to scarcity and high price of hay and fodder, and the long and severe winter.

Reports have been received from fifty-five counties in Pennsylvania, the majority of the correspondents speaking of the condition as "fair." The counties reporting "good" are Lancaster, Bradford, Cumberland, Elk, Green, Mifflin, Tioga, Cambria, Huntingdon, Somerset, and Lehigh. The correspondent writing from Sullivan County says: "Improved buildings and accommodations have told favorably upon the condition of cattle, and the fear of insufficiency in the supply of provender prevented the selling off of grain, and induced farmers to take more than usual care of their hay. The result is that cattle look well and will not suffer for provender." In Butler County cattle are said to be just living, owing to long winter and scarcity of food; the remaining counties reporting unfavorably from the same causes are Clearfield, Luzerne, Union, Forest, Adams, Cameron, and McKean.

The reporter for Kent County, Delaware, says the condition is good, in spite of the long, cold winter.

Favorable accounts have been received from the following counties in Maryland: Harford, Cecil, Carroll, Montgomery, Queen Anne, Calvert, and Anne Arundel. The causes assigned for the good condition are the feeding of more grain than usual, and abundance of corn-fodder.

The severity of the winter, and scarcity of hay and coarse provender, are attributed, by the correspondents for the counties of Washington,

Baltimore, and Kent, as the causes of the unfavorable condition of cattle in their respective sections of the State.

The reports from Virginia have been very full and complete; the reporters for sixty-three counties heard from are almost unanimous in speaking of the unfavorable condition of their stock, and all from the same potent causes—"severe winter and insufficient food." The correspondent for Mecklenburgh County says: "The utter failure of the wheat and oat crops compelled the use of straw and corn-fodder for teams, leaving only what could be picked up in the fields, and corn-stubble, for the cattle, and many have starved in consequence." The reporter for Buckingham County says: "Provender is now very scarce, and unless the spring opens very soon many must die of starvation." The only counties giving anything like a favorable report are Amelia, Highland, Henry, Pulaski, Montgomery, Botetourt, and Alexandria.

In more than three-fourths of the counties of North Carolina cattle are represented to be in sorry plight, after passing through an unusually trying ordeal. In fact, the winter was not over on the 1st of April, in some parts of the State, and fears were freely expressed of serious losses from exhaustion of provender before the appearance of spring pasture, such losses actually occurring in many places. Very few county reporters failed to note the severity of the season, the "oldest inhabitant" taxing his memory in vain for a parallel, while the scarcity of food of all kinds seems to have been almost as general, caused in part by the unusual demand upon it, and also by the drought of the preceding summer. In Hertford County the exceedingly bad condition is accounted for by the fact that the young reeds upon which the cattle depend for winter food were killed by the cold.

Greenville and Fairfield Counties alone, in South Carolina, return favorably; scarcity or entire exhaustion of provender being generally complained of, and superlatively bad reports being the rule, based upon the lack of food, and the rigors of an exceptionally cold winter and late spring, which unfavorable conditions were aggravated by a general absence of suitable shelter from the inclemency of the season.

In Georgia the winter was one of great severity, the cold weather and excessive rains telling fearfully upon cattle. Troup County alone, out of sixty-three reporting, returns condition as "excellent," and but nine others report at all favorably; while in the remainder the expressions "deplorable," "worse than for many years," &c., are so frequent as to become almost monotonous. In some parts of the State an unusual amount of snow fell, and from all quarters the scarcity of provender is complained of, resulting in many losses from starvation.

From Florida come the same accounts of the unusual inclemency of the season, with consequent suffering and many losses, although the condition was improving on the 1st of April, and in Levy County the increase of calves was reported at 100 per cent. greater than usual. But two counties heard from (Jefferson and Volusia) make favorable returns.

Lack of food and shelter, together with severity of winter and lateness of spring, are the causes assigned by correspondents in Alabama for the low condition of cattle generally; few counties breaking the uniformity of the report, Lowndes, Lauderdale, and Morgan alone forming prominent exceptions; in the first "better care," and in the last "the dry winter," furnishing explanations of the favorable aspect of affairs.

From Mississippi the returns are hardly more cheering, containing reiterations of the same depressing statements. The season throughout the South has been extremely trying to stock unprovided with shelter,

and depending almost entirely upon the range for subsistence. The reports of heavy losses from actual starvation are frequent, amounting to 50 per cent. of some herds in Newton County. In Wayne, also, many losses are reported, and a rapid deterioration in the ranges has caused a decrease of 80 per cent. in some herds within the past eighteen years.

Several reports from Louisiana are favorable, but the majority represent cattle as suffering from the severity of the winter. The need of care and shelter is repeatedly acknowledged. The La Fourche Reporter says: "Cattle need shelter, as in the North." In some places the losses are heavy, especially on the Attakapas prairies, where one stock-raiser lost four hundred to five hundred out of three thousand, one hundred dying immediately after the snow-storm of March 1. Thousands of cattle are estimated to have perished in Louisiana from exposure.

Three-fifths of the returns from Texas represent condition of cattle below an average. Among the counties in which stock is in "good" or superior condition are Red River, Fort Bend, Ellis, (better than for many years,) Colorado, (better than ever before,) Grayson, Blanco, Austin, Kendall, Williams, Hunt, (better than for two years,) Titus, Collin, Galveston, Harris, (20 per cent. better than last year,) Marion, Bell, and Anderson. The following extracts present a less desirable aspect of the case:

Medina, Texas.—Many losses, principally of old cows, from insufficient pasture on the prairies, owing to the dry fall. Improving rapidly now.

Rusk, Texas.—Poor; no shelter but the forest, and no food but dry grass and shrubs.

Nueces, Texas.—Very poor. Unusually dry for the past year, and water scarce. Cattle died by thousands in the winter, and if we have no rain soon, many cows will be unable to raise their calves.

Refugio, Texas.—Wretched, and the loss frightful; the result of the ruinous system of turning the cattle out upon the prairies with no provision for the contingencies of bad weather, &c.

Bee, Texas.—Loss, 25 per cent. Not less than fifteen thousand cattle have died of starvation and cold weather; ten thousand hides saved.

While the winter in Arkansas has been unusually severe, the condition of farm animals has been good in a majority of the counties. In Independence County cattle are represented to be in a wretched condition—worse than for fifteen years; and very poor in Montgomery, where there are "no winter-quarters but the woods, and woods-pastures are gradually deteriorating, so that all cattle will soon have to be fed in winter."

A majority of reports from Tennessee are comparatively favorable. The counties making the best returns are Wayne, Johnson, Meigs, Lawrence, Robertson, Rhea, Polk, Coffee, Putnam, Decatur, Blount, Humphreys, and Obion. In Putnam "more attention is given to sheltering." Sevier has had the "severest winter for fifteen years."

The favorable returns from Kentucky greatly outnumber those of poor condition. The winter has been long and severe, and feeding was still continued.

A majority of the reports from the Ohio valley and lake States are decidedly favorable. A few items from correspondence will give an idea of their varied character.

WEST VIRGINIA.—*Pocahontas:* Fine condition in spite of variable winter. *Greenbriar:* Bad condition and considerable loss. Winter long and cold; feed scarce; some grazers are cutting linn and sugar timber to keep their cattle alive. *Marion:* Cattle look well when well fed. Hay scarce. *Berkeley:* Exceedingly poor and weak; many will probably die. *Clay:* Finer than for years.

OHIO.—*Logan:* Cattle in unusually good heart and condition. Winter pasture has been too much depended upon, though our blue-grass beds, retaining their verdure through summer and winter, have had their influence for good. *Hamilton:* Better than last year; better care taken. *Franklin:* Most excellent; much better care taken.

Marion: Very good; feed plenty; weather dry. *Jefferson:* Not so good as last year; winter too long. *Brown:* Moderately good, considering the long winter. *Fayette:* First rate; never better.

MICHIGAN.—*Ottawa:* Long winter and scarcity of feed will cause loss of animals, also of butter and cheese. *Clinton:* Average; unusual amount of straw and grain feeding. *Mecosta:* Thin, but in good heart. *Leelenaw:* Not very good; food scarce through long, hard winter. *Tuscola:* Very good, considering the high price of hay.

INDIANA.—*Hamilton:* Fine; better than common; winter favorable to out-door feeding. *Cass:* Better than for many years; forage well saved; weather favorable. *Clark:* Tolerably good; would have been better but for the burning of prairie-grass last fall. *Decatur:* Good; dry winter; favorable for close feeding. All feed, except corn, scarce. *Crawford:* Poor; feed scarce. Feeding-season commenced six or eight weeks earlier than usual, after many farmers had sold their hay. *Wayne:* Cattle wintered well. No cold rains or sleet. *Parke:* Good so far, but feed becoming scarce. *Union:* Average; scarcity of feed made up by better care.

ILLINOIS.—*Winnebago:* Cattle that have had plenty of water have done well. Supply of water very limited. *Mercer:* Fine; abundant stalk-fodder. *Clinton:* Fine when well cared for. *Edwards:* Good, though feed is scarce; winter dry. *Alexander:* Good, but not equal to last year. *Schuyler:* Remarkably good. *Bureau:* Thin, though food is plenty.

WISCONSIN.—*Fond du Lac:* Thin from long-continued winter—one hundred and thirty-five days of unbroken sleighing. Feed badly dried up before the snow fell. *Ontonagon:* Will be poor before grass comes again. *Juneau:* Good so far, but will be slim by next grass. *Jefferson:* Good, considering the long winter. *Trempealeau:* Extra good.

MINNESOTA.—*Blue Earth:* Excellent. *Meeker:* Generally good, but winter protracted. *Watonwan:* Remarkably good. *Houston:* Excellent generally; feed plenty and cheap. *Winona:* Poorer than usual. *Goodhue:* Very good; winter mild; feed abundant. *Dakota:* Better than last year.

IOWA.—*Plymouth:* Good in spite of the hard winter; hay feeding and shelter extensively provided. Regularity of feeding with a regular salting have been found of great value. *Polk:* Unusually good; corn abundant. *Mahaska:* Better than usual. *Hardin:* First rate; very little feed except what is found in the stalk-fields. *Clayton:* Poorer than for fifteen years. *Lee:* Unusually good; better than last spring. *Jasper:* Better than ever known. *Humboldt:* Excellent. *Grundy:* Poor; county new. Proper care not taken. *Monona:* Fair; some large herds almost fat. Grass will not come before May 10; the average condition will then be depressed.

In Missouri but twelve of seventy-two counties reporting show superior condition:

MISSOURI.—*Cape Girardeau:* Thin, but plenty. *Jasper:* Never better than now; feed plenty and cheap. *Moniteau:* Good, but at heavy expense for feed. *Bates:* Never worse than this spring; winter cold; feed scarce. *Johnson:* Much better than usual. *Howard:* Poor condition; winter extremely cold and blustery. *Franklin:* Poor; winter very severe; hardest frosts ever know in Missouri. *Phelps:* Average, but has required more than usual feed. *De Kalb:* Look hard for want of shelter and feed. *Lawrence:* Twenty-five per cent. better than last spring. *Barton:* Cattle have done unusually well; freer from disease than for many years. The winter has been remarkably favorable, being very dry. *Lewis:* Sheltered cattle have done well.

In Kansas and Nebraska there has been much suffering among the domestic animals, a large proportion of it among the unacclimated Texas cattle, immense numbers of which were kept over by drovers rather than sell at prevailing prices. Native animals are reported in good condition in about half the counties.

KANSAS.—*Osage:* Many cattle very weak, others dying; seem to be starving to death while fed an abundance of prairie-hay which was cut very rank. Only straw and corn-fodder has kept cattle alive. One man lost three hundred and fifty Texans out of six hundred. Many Texas cows do not give milk enough to keep their calves alive. *Marion:* Very poor. Losses through starvation from 20 to 75 per cent.; last fall most of the prairie-grass was burned. Native cattle, average; Texans horribly poor. *Dickinson:* Very poor and weak. Lack of shelter and food. Thousands of Texans have died. *Washington:* Native cattle, fair; Texas and Cherokee very poor; many dying from inanition. *Saline:* Winter harder than ever known. Native cattle have lost lightly; Texans about one-third. *Sumner:* Stock went into winter-quarters poor and are coming out poorer. Cattle kept in the range without feeding have suffered fearfully, some herds losing 75 per cent. and others 50 per cent. Those feeding hay have lost less, from 10 to 25 per cent. A series of cold rains would just now complicate matters seriously. *Labette:* Better than ever before. Feed excellent and abundant. Better shelter afforded. *Bourbon:* Poor, but no worse than usual. No shelter. *Shaw-*

nee: Bad condition from want of shelter. *Neosho:* Native cattle good; Texas cattle poor. *Morris:* Texas cattle lost from 35 to 50 per cent. Domestic cattle in good condition. *Ellsworth:* Poorer than ever before known. *Republic:* Below average. Natives in fair condition, but Texans starved out. *Greenwood:* Winter severe on cattle; hay less nutritious than usual; no tame grass sown; wet summer made the prairie-grass rank and poor; very little shelter provided; hence more native cattle have died than usual, and the survivors are quite poor. Texas cattle have suffered still more; losses from 20 to 50 per cent. *Lincoln:* Very poor, generally speaking; cattle have met with heavy losses. Of a herd of 431 Texas and 133 native cattle, one-half of the former and one-fourth of the latter have died. About 8,000 Texas cattle wintered in the county.

NEBRASKA.—*Nemaha:* Condition fair; feed plenty. Texas cattle have suffered from bad weather, and some have died; in *Madison:* Cattle sheltered have done well, but very many have died from lack of shelter. *Merrick:* Very poor; little care taken. *Boone:* Rather thin; many settlers came too late to put up hay. *Webster:* Cattle have suffered severely; large heard of Texas cattle have died, beside many natives.

Cattle have wintered as well in the Rocky Mountains and on the Pacific coast as in Texas, or in the Missouri Valley, from the Mississippi River to Dakota. The grasses, dwarfed and unusually dry in some localities from the droughts of last summer, were more nutritious than those of moister climates. All the reports from Dakota are favorable; some representing stock to be in better order than last spring, "notwithstanding the extreme cold." The stock of the Indian Territory is reported comparatively poor, but generally healthy. Colorado and Wyoming have experienced a very severe winter, "the severest ever known," as some report, with much snow covering the grasses of the plains, and driving herds to the bare-foot hills, often crowding the range and threatening starvation. Yet there are herds in these Territories that are in good condition, having suffered little loss. From El Paso County, Colorado, which has a very high elevation, the report is "fine condition, better than last year." The winter has tested the reliability of this region for winter stock-feeding, and proves that a limited number, with proper attention suitable natural or artificial protection, and feeding in storms or heavy snows, can be cheaply kept, with as good a prospect of immunity from suffering or loss as in almost any other section of the country. In New Mexico the winter has been exceptionally favorable for stock-raisers, and almost equally advantageous in Utah; only in Summit County are cattle "generally poor, the winter being unusually wet and stormy." The severe droughts in Arizona, for two or three seasons past, have interfered sadly with the condition of stock in that Territory. In Montana, cattle are thin, but healthy, and in Washington they are generally in fine order, as also in Nevada, and in Oregon, except where entirely neglected. In South California the drought of last season left little feed for winter, and cattle suffered much in the early part of the season. Favorable returns come from Plumas, Santa Clara, Del Norte, Lake, Mendocino, Tuolomne, and most of the northern counties.

CONDITION OF SHEEP.

In a majority of the counties in New England, sheep are reported in good or average condition, although the winter has been long and the latter part unusually severe, occasioning in many places considerable loss of lambs.

Scarcity and high price of hay are complained of in several counties, but, where the deficiency was supplied by an increase of grain feed, the result was rather favorable than otherwise. The advance in the price of wool has also acted as an incentive to increased attention to the comfort of flocks.

Our correspondent in Piscataquis County, Maine, writes as follows:

Sheep are not yet out of winter quarters, but look better than usual, owing to freer use of grain to make up the deficiency in hay. There has been a marked improvement in the condition of flocks within a few years. We have become convinced that, the better the breed and the more the care bestowed, the greater will be the profit.

The most unfavorable reports are from Oxford and Hancock Counties, Maine: In the former the loss of lambs dropped, up to April 1, was placed at 15 per cent., while in Hancock many sheep have died from scarcity of hay. But two other counties in the State (Cumberland and York) show less than an average condition. From Kent County, Rhode Island, we have the annexed statement:

Sheep were in rather better than average condition a month ago, but March has been almost unprecedentedly severe, and, as it is usually the lambing month in this county, there has been more than the average percentage of loss, both of sheep and lambs.

But three other reports of similar tenor were received from New England, while the expression "very fine," "first rate," &c., are frequently used.

From New York the reports are favorable, with a single exception, *i. e.*, Warren County, where they are "poor from the long, cold winter and scarcity of provender." Twenty-one counties return fair average condition; other reports vary from "better than usual" to "first rate." The season, although cold, was generally dry; "not a single rainstorm" in Livingston County, and in Sullivan "the ground bare most of the winter," &c.

In New Jersey, Pennsylvania, and Delaware there has been very little complaint of unfavorable effects from the unusually cold winter, Cape May County alone, in New Jersey, reporting "very poor," the others ranging from fair to very good, while out of forty-four counties in Pennsylvania, but five make unfavorable returns, the causes assigned in these cases being severe weather and scarcity of provender.

The beneficial influence of the advance in price of wool is frequently cited in the Middle States, as well as New England.

The reports from Maryland are not so uniformly good, especially from the Eastern Shore; the cause assigned is the severe winter and, in several instances, scarcity of provender. There is much disparity in the climatic conditions of different sections: In Washington County the condition of the sheep is not so good as last year, but the loss of lambs less, from the dry weather, while much snow and great loss of lambs are reported from Calvert.

The following is an extract from the return from Queen Anne County:

Sheep are looking well. The great advance in the price of wool has made farmers more than usually careful of their small flocks, all being now desirous of increasing their numbers—so much so, indeed, that I fear many will finally run into the other extreme.

In Virginia the showing is still more unfavorable; a small majority of the sixty-one counties reporting place the condition below an average, the general complaints being scarcity of provender and the severity of the winter-snows. Losses of lambs from these causes are reported in the counties of Bath, Campbell, Fluvanna, Prince William, and Chesterfield; in the last-named county, in some good flocks, which were not properly sheltered, almost every lamb perished.

The following is from Buchanan County:

Sheep are in usual condition. They are rarely ever fed, but run in the mountain ranges all the year round, as the deepest snows generally thaw in two or three days on the south sides of the mountain and winter fern is abundant.

The general tenor of reports from the Carolinas and Georgia is not favorable, the winter having been severe, and in many places food scarce from the drought of the preceding summer or the unusual lateness of spring pasture. In the counties of Harnett, Rockingham, Franklin, Alexandria, and Transylvania, North Carolina; Lexington and Kershaw, South Carolina; and Cobb, Heard, Clayton, and Pickens, Georgia, insufficiency of forage is especially noted, while in Madison, North Carolina, the bad condition is supposed by some farmers to be the result of too free diet of acorns in the fall and early winter. Stokes County, in the same State, also reports an abundant mast, but no ill effects from it. The severity of the winter has told against the young lambs in some localities, a loss of more than 50 per cent. being reported in Davie County, North Carolina, and "lambs dying fast" in Bamin, Georgia; and in McDuffee County, same State, the loss of old sheep is estimated at 20 per cent.

Although these unfavorable reports cover a majority of the counties in each of the three last-named States, a large minory of the returns indicate an "average" condition, and from that up to "very fine" in Forsyth, North Carolina. About the same condition obtains in Florida, but in the other Gulf States, Arkansas, and Tennessee, more than two-thirds of the counties reporting range from "average" to "better than for ten years," in Hunt and Williamson, Texas. Where the returns are unfavorable, it is generally attributed to the severity of the winter and lateness of spring. The most prominent statements of this character are from Hillsborough, Florida; Livingston, Choctaw, and Bibb, Alabama; Yalabusha, Jasper, Grenada, and Yazoo, Mississippi; Washington, Louisiana; Fayette, Nueces, and Cherokee, Texas, (the only unfavorable reports from that State;) Columbia and Independence, Arkansas; and Sevier, London, Giles, and Johnson, Tennessee. In Conecuh, Alabama, two-thirds of the lambs were lost from late cold weather and rains, although the adult sheep were looking well. Fentress, Tennessee, also reports considerable mortality among lambs.

Correspondents in nine counties of West Virginia report less than an average condition; of these, Tucker and Randolph return "very poor," Berkeley "poor and feeble," the rest using adjectives of lesser import. In Upshur County "sheep have done remarkably well, considering they have been without shelter or grain-feed," and in Mercer they have wintered better than cattle, one flock of four hundred head having subsisted upon short grass and the roots of blue grass, with less than one ton of hay. Other returns vary from "good" to "excellent."

From the western States, (California excepted,) and also from the Territories, come very generally cheering reports, not one of contrary tenor from Ohio; and only the counties of Macomb and Mecosta, Michigan; Crawford, Perry, and Switzerland, Indiana; Jersey, Illinois; Iowa, Wisconsin; Nicollet and Winona, Minnesota; Grundy, Iowa; and a very small proportion of those in the other States marring the favorable showing.

In a few localities complaint is made of the shedding of wool from the effects of the severe winter or scab, the most marked instance being in De Kalb County, Missouri, where many are reported "naked from scab, and dying from poor keeping." In Ottawa, Michigan, they "suffered considerably with ticks, from close confinement, and most of the lambs perished." Loss of winter lambs is also reported in Fayette, Ohio, although the dams were in good condition. Few complaints have been made of scarcity of provender, and a general inclination to give more attention to this class of stock is evinced.

From California the statements are very conflicting, but their general tenor is much less favorable than from other parts of the West, as is indicated by the following extracts from county reports: San Diego, "Wintered badly; very poor in January;" Stanislaus, "Poorer than ever before; loss by starvation 5 per cent.;" Del Norte, "Splendid;" Sonoma, "Very poor; winter severe;" Toulumne, "Above average; mild winter;" San Bernardino, "Poor; food cut short by drought," &c.

DISEASES OF FARM ANIMALS

Disease has not cut off an unusual number of farm animals during the past year. Where cattle are most valuable, whatever the rigors of the climate or local scarcity of feed, the loss by disease is comparatively small, by reason of the care which is found by long and bitter experience to be profitable. A large proportion of the losses reported is the result of neglect, exposure, and insufficient or innutritious pasturage or other feed. Some mortality and much reduction of flesh result from the inhumane practices of drovers, with the aid or abetting of transportation companies. Several deaths are reported at Alleghany City, resulting from the barbarous practice of stuffing animals with salted feed to induce them to drink largely, for the purpose of making good upon the scales the depreciation in weight occasioned by the deprivation and suffering of the passage by rail. The occurrence of "murrain," "hollow horn," and diseases reported by various meaningless names so common in the Southern States, where cattle are left to the tender mercies of a rigorous winter and dead woody stalks of coarse grasses, might be avoided in a large measure by adequate attention to necessary supplies and protection.

The rigors of the past winter have proved conclusively the necessity of protection, not only in the more northern of the Southern States, but in Texas, where large numbers of cattle, estimated variously at 100,000 to 200,000 head, have succumbed to the combined agencies of cold and starvation. The pretense that shelter is unnecessary on the elevated plains of Colorado and Wyoming is also exploded, large losses, especially of Texas cattle, having occurred during the past winter. It is true that small herds, and in some cases large ones, have been sheltered in the cañons and in the lee of banks of streams, and wintered with little loss; but it is unmerciful and untrue to assert that no provision for shelter is or will be necessary in those elevated pasture-grounds of the plains and Rocky Mountains.

Horses have suffered less than in some previous years. Cases of the various forms of disease reported have generally been isolated.

The details concerning diseases of the several species of domestic animals will be given under separate heads, and will convey an idea of the comparative prevalence of each form of disease.

DISEASES OF HORSES.

LUNG FEVER.—Horses have been comparatively free from this disease throughout the country. Several fatal cases are reported from Aroostook County, Maine. The animals were at first affected with what appeared to be a violent cold, soon followed by prostration and death. Franklin County, Vermont, reports two deaths from this cause. A few fatal cases are also reported from Chester County, Pennsylvania, and

Upshur County, West Virginia. The correspondent for Queen Anne County, Maryland, in writing of this disease, says: "Many horses die shortly after the attack, from want of timely and proper attention; but when taken in time the disease will almost universally yield to proper treatment and careful diet."

PNEUMONIA.—But few cases are reported. It was, however, the prevailing disease reported by the correspondent for Providence County, Rhode Island; and a few cases are heard from in Queens County, New York.

STAGGERS is reported by the correspondent for Moore County, North Carolina, as existing to a considerable extent. Cases also occurred in Bladen and Craven Counties. In the latter county it attacked young animals chiefly, destroying at least 50 per cent. of those attacked. The correspondent suggests the following treatment: "Bleed freely from the neck, followed by a good drench of salts; elevate the head, forcibly inject two ounces tincture cantharides up each nostril, to blister mucous membrane, and act as a derivative; feed with a mash of wheat-bran, occasionally oats, each scalded thoroughly, plenty of cool water, and moderate quantities of green fodder if attainable." Losses are also reported from Fairfield County, South Carolina, supposed to have been caused by eating unsound corn, or that which had been overflowed in meadows. Wilkinson County, Georgia, reports cases; also Tuscaloosa County, Alabama; Lee County, Mississippi; Cherokee County, Texas; Jackson County, Arkansas; Coffee and Lauderdale Counties, Tennessee.

GLANDERS.—But few cases are reported. Several died in Litchfield County, Connecticut; a few cases existed in Surry County, Virginia; Hillsborough County, Florida. It has prevailed on one farm in Winston County, Mississippi; a few cases in Mercer County, West Virginia; and Trimble County, Kentucky, reports fifteen or twenty cases.

DISTEMPER, spoken of by many reporters as diphtheria, has existed, but doubtless the majority of the cases so described were nothing more than those of ordinary distemper. The correspondent for Niagara County, New York says the disease proved fatal at first, but after a little experience was treated successfully. Cases are also reported from Luzerne County, Pennsylvania, where it is termed a "malignant distemper;" Buncombe County, North Carolina; Chesterfield County, South Carolina; Orange, Hillsborough, Manatee, and Santa Rosa Counties, Florida, and Choctaw County, Alabama. In Victoria, Austin, and Nueces Counties, Texas, many colts, and in some cases grown animals, have died. The disease has also existed in Izard County, Arkansas; Upshur County, West Virginia; Lewis County, Kentucky; Madison County, Indiana, and in Boone County, Illinois. Sonoma County, California, an "epizootic distemper" is spoken of; the cases yield readily to treatment.

FARCY.—A few cases have occurred within a short time in Buckingham County, Virginia. The disease was originally introduced by the Army horses, in 1865. Every case heard from in this county proved fatal, obstinately resisting all remedies, and serious apprehensions are entertained that the much dreaded malady will spread as the spring opens. Choctaw County, Alabama, reports a few cases.

CHARBON is reported only from Phillips County, Arkansas. The treatment adopted was to sear the affected part with a hot iron and scarify the wound a few days afterward.

QUINSY prevailed only in Baltimore County, Maryland, and, though not often fatal, interfered very much with farm work last spring.

BOTS.—A few animals were attacked in Winston County, Mississippi,

and Obion County, Tennessee. The correspondent for the latter county says: "The remedy is to give sage tea, sweet milk, and molasses, which causes the worms to let go their hold, and then an active purgative to carry them off."

Cases of "new" or "unknown" diseases are reported by correspondents which it is impossible, from the descriptions given, to place under classified heads, the general symptoms in many cases only being given or a statement to the effect that they resemble diseases of a particular type.

The following account is from Norfolk County, Massachusetts: "Within a few days a large number of horses belonging to the street railroad companies have been affected with a new disease; it has proved fatal in several cases, and as yet no positive remedy has been discovered."

In Litchfield County, Connecticut, deaths resulted from a disease resembling farcy or glanders.

In Washington County, Pennsylvania, seven died of an affection resembling inflammation of the intestines.

The reporter for York County, Virginia, says: "Nearly all the horses died on one farm from some unknown cause."

In Wakulla County, Florida, many losses occurred, especially among mules: "On examination the intestines were found to be filled with sand."

In Crittenden County, Arkansas, buffalo gnats kill more than all the diseases.

Huntington County, Indiana, reports numerous deaths from diseased lungs, throat, and head.

The correspondent for Peoria County, Illinois, says: "A neighbor of mine raised Hungarian grass last year for hay; fed it to his horses during winter; one horse became entirely disabled, 'stiff;' the animal finally recovered."

In Clackamas County, Oregon, the "stiffs" is considered incurable, and is supposed to be caused by a dry fern mingling with the hay.

Several horses died of a new disease in Dickinson County, Kansas, the symptoms of which are as follows: "Cough, yellow matter running from the nose, swelling of the throat, increasing weakness, and death. It is not distemper or glanders; veterinary surgeons do not know what to do with it nor what it is."

During May and June, 1871, a fatal malady was developed among the horses used by the different street railroad companies of New York, and extended its ravages also to the horses owned by hackmen and truckmen. Horses used to work, but kept on highly nutritious food, and suddenly put to hard work after a period of repose, were especially liable to the disease. At first the animal stumbled with his hind legs, which became shaky and difficult of movement. The hind pasterns became infirm: the joints between the upper pasterns and the shanks bent forward, in some cases breaking down, the animal finally becoming unable to stand and remaining in a lying posture. All the muscular movements dependent upon nerves radiating from the spinal colum, behind the dorsal vertebræ, were gradually paralyzed. When the horse lost power to move his tail or to retain his evacuations the case was considered hopeless. Prior to that point a cure was not impossible. Removal to comfortable quarters, placing the food within easy reach, and perfect quiet were found generally effective. Where fever was low it was not judged necessary to use drastic medicines. Fever was removed by counter-irritants, especially strong fly-blisters. The disease seriously affected the efficiency of the railway companies for several weeks.

DISEASES OF CATTLE.

SPLENIC (TEXAS) FEVER.—A few cases of this noteworthy climatic disease are reported. The same distinctive features mark every outbreak. New evidences that its germ originates in the miasmatic or tide-water region, not only in Texas, but in all the coast lands from Texas to Virginia, accumulate yearly. Our correspondent in Fluvanna County, Virginia, (north of the James River, between Richmond and Lynchburgh,) thus writes:

> There are some strange facts connected with the cattle disease common to the lower tide-water counties of Virginia, known commonly as murrain, bloody urine, or distemper, which may throw some light upon the Spanish fever following in the track of Texan cattle. In certain districts of this State murrain has always prevailed in certain seasons, attacking most frequently young and fat cattle of both sexes. It is well understood that if cows are removed from Upper Virginia to Richmond, or the lower counties, they are very apt to die the first year, whereas cattle brought from the lower counties up to Richmond escape. For this reason milch cows brought from Gloucester and other lower counties are much preferred by Richmond buyers; yet, in Gloucester, I have known seven cows out of ten to die of murrain in one fall. Again, throughout certain counties on the south side of the James River, extending to the North Carolina line, cattle are subject to murrain, while in other counties directly abreast of them, on the north side of the river, the disease is unknown, unless communicated by cattle brought from the south side, that in some way infect them, while those from the south side keep well. There seems, then, to be some inherent taint in the constitution of cattle living in certain regions, which may be communicated by contact, and this, while in some cases traceable to climate, in others exists when we can discover no difference in climate. A long acquaintance with Texan cattle introduced into Louisiana warrants the opinion that they neither die themselves of this disease nor communicate it to the native herds in Louisiana.

The fact that Texas cattle do not communicate the disease to Louisiana stock is well known, and the reason is obvious, viz, both sections are miasmatic. The coast cattle do not communicate splenic fever to other coast cattle, but to herds above tide-water. The fact is indisputable that cattle of the tide-water counties of Virginia, the Carolinas, Georgia, Florida, and other States on the Gulf coast, do communicate a fatal disease to stock of higher elevations and more salubrious climate, and that this disease has very marked and distinguishing symptoms and peculiarities which are almost invariable.

A correspondent in Murray County, Georgia, writes of a disease which he thinks, from *post mortem* examination, presented "well-marked and clearly defined cases of splenic fever." He says it has broken out each summer since 1865, and continues till frost. He does not describe its attendant circumstances and symptoms, or say whether its advent was heralded by the coming of coast cattle. It may, therefore, or may not, be the veritable splenic fever. Murray County lies in the northwest corner of the State, toward Chattanooga, and appears to have a climate in which the splenic contagion might take. In Gilmer, an adjoining county, are reported "a few cases of Spanish (splenic) fever among cattle brought from more southern latitudes." If the true splenic fever, this must be misreported, and must refer to native cattle "among cattle brought from more southern latitudes."

In Knox County, Tennessee, this disease prevailed last summer mainly among milch cows exposed to contact with Texas cattle at a point where they were fed, in their passage to Virginia.

In Lincoln County, Kentucky, in February, 1871, thirty-five Texas cattle were pastured with native stock. In July, the latter began to sicken of Texas fever, and about twenty died. The Texans fattened and did well.

In Logan County, Illinois, seventy-five Texas cattle were placed in

pasture with two hundred natives, mostly three-year-old steers; thirty-four head of the latter died of the fever. A drove in Cass County lost seven that had contracted the disease by being shipped from Kansas in cars in which Texas cattle had been carried. In Scott County several deaths from Spanish fever are reported.

In Taney County, Missouri, twelve animals were attacked with splenic fever; only one recovered.

The disease has existed in Kansas more than elsewhere, on account of exposure to cattle from Texas. In the northeastern part of Sedgwick County, where Texas cattle were pastured to the utmost capacity of the "range," many of the native cattle died. In other portions of the county, in which Texas cattle also ranged, the loss was small. Only native cattle were attacked, the improved breeds suffering most, and the scrubs least. In the southern part of Neosho, where Texas cattle were pastured, native cattle took the disease merely by crossing the track of the Texas. In Morris, the loss by splenic fever was 25 per cent.; some farmers lost all their native stock. The loss in Marion is estimated at 100 per cent. The loss in Lyons is placed at 5 per cent.; in Montgomery, 10 per cent., but no case occurred among cattle in inclosures; in Allen, one hundred head; in Labette, where the stringent law against the movement of Texas cattle was evaded by driving across the border at night, many cattle in the vicinity of their trail were attacked, and three-fourths of the number died. In Dickenson and Washington several cases occurred. A drove of Texans passed through the southeastern part of Woodson in August, and in about two weeks the disease broke out among the native cattle, with fatal effect.

The following is an account of the breaking out of this disease in a high latitude:

Fort Randall, Todd County, Dakota.—An outbreak of "splenic or periodic fever" among beef-cattle, (about two hundred head,) at this post, commenced in May, 1871, when ten deaths occurred; in June, six; in July, ten; in August, twenty-two; and in September, three. The epidemic reached its acme about the middle of July. The total number of deaths, in two hundred head of cattle, was fifty-one. Mode of invasion, rapidity of course of disease, and death occurring at an early period, together with *post mortem* appearances, prove conclusively that it was "splenic fever," the affection described by Professor John Gamgee, in report of the Agricultural Department. It is highly probable that the cattle arriving here in two different lots have had the disease communicated to them by passing over, or having been herded in, sections of country previously traveled over by droves of Texas cattle *en route* to supply the various Indian agencies along the Missouri River.

The disease is reported by correspondents in Benton, Prairie, and Independence Counties, Arkansas.

Independence County, Arkansas.—Spanish fever has not been seen for three years past—that is, since the law was passed prohibiting the passage of Texas cattle through the State—until last June, when five wagons from Texas, drawn by twenty yoke of oxen, passed northward on one of our principal roads, camping a day or two in a place, and their cattle allowed to graze near the road; and, strange as it may seem, fever attacked our own cattle at each of these camping places within this county, and probably one hundred of these cases proved fatal. Those in pastures, having no access to these places, were not attacked. The infection seemed to lose its influence in about thirty days after the passage of the Texas oxen. I am not able to give the actual loss in this county at that time. It was probably between one hundred and one hundred and fifty head.

Several cases are reported in Nemaha, Nebraska; and heavy losses in Santa Clara, California, are imputed to splenic fever, but the facts are not sufficient to identify the disease as splenic fever.

PLEURO-PNEUMONIA.—A dozen cases of this disease have occurred in Ocean County, New Jersey. It was treated by bleeding, blistering, the use of carbolic acid about the stalls, of aperients and diaphoretics. In Burlington County the county agricultural society, at its annual

meeting, appointed a committee to urge the State legislature to devise measures for the extermination of the disease, which had a foot-hold in that vicinity. In the northern part of the county three cows and a bull in a herd of twelve were attacked in September, and died. No cattle had been introduced into the herd for a year previous. Two other herds in the same locality were attacked in December and suffered till March, with a loss of eight head. One calf died at six weeks old, although the mother showed no signs of the disease. Not a single animal recovered which showed positive symptoms of the disease. On fifteen farms in Camden the aggregate loss from this disease is placed at one hundred and twenty head.

Pleuro-pneumonia has prevailed to considerable extent in Baltimore County, Maryland, principally in the vicinity of Baltimore City, the heaviest losses generally occurring where the cows were kept in close, filthy stables. Experience has shown that cleanliness and thorough ventilation have great effect in checking the disease. There are still some cases, and it is proposed, if it does not soon abate, to try inoculation, which is claimed to be safe and reliable.

Pleuro-pneumonia has also prevailed to some extent on several farms near Chadd's Ford, Pennsylvania, with a few isolated cases in other parts of the county.

EPIZOOTIC APTHÆ.—"The foot and mouth disease," recently introduced from Europe, is not reported as prevailing at any point at the present time. In the early part of 1871 it still lingered at several points in New England, as in the vicinity of Providence, Rhode Island, and in Litchfield, Connecticut. The infection came to the latter point from Albany, but animals infected were kept isolated and the disease spread very little.

ABORTION has not been so prevalent as to be especially referred to, except in Oneida County, New York, where 5 per cent. of the calves were lost, occurring mostly where the cows were weakened by being milked late in the winter; in Otsego, where a few cases occurred; in Chenango, many cases, the loss to the farmer in each being from $15 to $25; in Litchfield, Connecticut; in Essex and Sussex, New Jersey.

In Mercer, Pennsylvania, a fever and inflammation of the womb has prevailed among cows soon after calving, which has generally proved fatal unless prompt attention is given.

"BLACK LEG" is reported in many places in different sections of the country. No remedy is reported as efficient.

In Coryell, Texas, many deaths of cattle were caused by the "heel-fly," which resembles the bot-fly, and is a great annoyance, driving the cattle into the water and into thickets where they cannot graze. It appeared about January 1.

VARIOUS DISEASES.—Our correspondent in Kent, Michigan, thus describes a prevalent disease:

A cattle disease commenced last fall east of Ionia, extending on the north of Grand River, westward to Plainfield, and thence south over a belt of country. It attacked cattle of all ages and conditions, but especially young cows. It affected the fourth stomach, duodenum, liver, gall, bladder, and circulating system. The pathology of the disease showed, upon dissection, a putredinous formation, and a discharge of bile into the duodenum from the pale ash-colored, macerated liver. The predisposing causes of the disease are various. The diseased bile from the liver is evidently the reason of the putrid contents of the duodenum, but whether this springs from smut in corn is another question. A cow which sickened and died within an hour had been fed daily for two years with a pailful of kitchen swill and two pailfuls of bran, with such coarse food as she could pick up from various dung-hills. The course of the disease is rapid, generally from half an hour to two hours. The animals are uneasy, stepping about, striking their hind legs against the abdomen, lying uneasily upon the

ground, groaning, feeble pulsation of arteries, heart-action reduced, breathing somewhat quickened, the mucus coat of the mouth and eyes looks pale and bluish, paunch mostly full of food, but not distended with gas, nose and extremities cold. A *post-mortem* examination shows that muscular and nervous systems are in a normal condition, and that all the organs within the thoracic and abdominal cavities are healthy, except the liver, the gall-bladder, the duodenum, and the pyloric portion of the abdomasum, which shows no signs of congestion or inflammation, but are bloodless and colorless. The serous coating is of a pale-bluish hue; the muscular coat of the duodenum a darker hue; the softened mucus coat of a darker violet. The gruel-like contents of the duodenum, from the point where the biliary and pancreatic ducts discharge their fluids into it, are of a pale or greenish-black color, diffusing an intensely penetrating foul smell. The coating of the liver is of a pale-tan color, and its substance soft. The gall-bladder is of a dark-pale green. The mesentery, stomachs, and digestive canal on either side, from the pyloric portion of the abdomasum and duodenum, are bloodless and pale. The blood is black, insufficient in fibrine. These facts all indicate that the disease consists of a peculiar disorder of the liver, caused by a diseased state of the blood; the bile secreted from the same in turn disorders the digestive function and produces an unhealthy gastric juice. No treatment has been found effective. To a certain degree the disease may be prevented by avoiding all smutty, rusty, musty, or over-ripened corn, and by feeding roots always seasoned with a little salt, with an abundance but not an overplus of pure, clear water.

In Bedford, Tennessee, several deaths are attributed to the same cause.

In Washington, Kansas, disease, attributed to eating smutty stalks, has been fatal in few cases.

Our correspondent in Orange County, Florida, refers to the prevalence of salt-sick, attributing it to the deficiency of phosphates in the grass. A similar report comes from Levy County, Florida. Cattle began to look badly in September, after the wet season and high water of August, and nearly one-third have since died.

"BLACK-TONGUE" has been very fatal in Suwanee, Florida, destroying from one-tenth to one-half of several herds, while others were entirely exempt. "The throat swells at the root of the tongue, as in horse distemper, and prevents the animal from eating." The same disease has prevailed in Worth County, Georgia, where the loss has been greater than the natural increase. "The symptoms are stiffness in the legs, turning around and staggering, slavering, tongue black and coated, unable to eat."

"HOOF-AIL" has been common in Essex, New Jersey, and several cases are reported in Hunterdon, supposed to have been brought by drove-cattle from Western New York and Pennsylvania. Blue vitriol, tar, and lard, and sometimes salt and water or fish-brine, were applied as remedies.

The following extracts from correspondence give accounts of several nameless, misnamed, or unknown diseases:

Aroostook, Maine.—No fatal disease, but all of my horned-cattle suffered, about the 1st of March, from a sudden attack of scours, without any apparent cause, and there have been quite a number of similar cases while the animals were being fed on dry hay.

Patrick, Virginia.—A disease is now prevailing here called "bloody murrain," "dry murrain," or "lung disease." Cattle are often affected some time before the discovery is made. The symptoms are sluggishness and emaciation, although the appetite is good, accompanied by a flow of blood from the bowels when a purgative can be made to take effect. A *post-mortem* examination shows that the food has become hard and dry in the stomach, and the lungs congested. No specific is known, though a drench sometimes gives relief. The disease seems to abate in very cold weather.

James City, Virginia.—Several cows have been singularly affected this winter. Two milch cows with weakness of loins and partial loss of use of hind legs, and one with inflammation of eyes, bordering on blindness. These animals appeared well in other respects, and had good appetites. They improved on a change of food from corn to rutabagas.

Lunenburgh, Virginia.—A *post-mortem* examination was made upon some cattle lost last summer from a disease called "distemper." It was found that the first stomach was

highly inflamed, and contained considerable quantities of old-field grass, called "broom," (embracing three distinct species of *andropogon*,) in an undigested state and compacted into hard wads. If these cases were really distemper, the examination showed the immediate cause of death, but did not make it clear whether the digestive organs were deranged, or the substance entirely indigestible.

Gloucester, Virginia.—The disease known as "murrain" has prevailed to an alarming extent. On one farm twenty-one out of thirty cattle died, and on a place adjoining the loss was two out of twenty-two. Each of these herds was penned at night, but they ranged within the same inclosure during the day.

Henry, Virginia.—A disease called "Carolina distemper" prevailed in the southwestern part of the county last August and September, carrying off more than fifty head. It was fatal to 75 per cent. of the cattle attacked.

Chesterfield, Virginia.—A very fatal disease prevailed in the autumn, which resembled murrain, but was not certainly named. Loss, at least 10 per cent. of the cattle in the county.

Harnett, N. C.—Considerable mortality from a disease called, by some, murrain or yellow murrain, for which no remedy has been found. Symptoms, loss of use of limbs, soon followed by death.

Stokes, N. C.—A fever called distemper or murrain has carried off many cattle—two-thirds of all attacked—although many farmers profess to be able to cure it. Costiveness and discharge of bloody water usually are symptoms. I have used with success, for many years, as a preventive, a mixture of equal parts lime and salt placed where the animals had free access to it.

Kendall, Tex.—During last December twenty-six head of cattle died upon three farms from a disease supposed at the time to be hydrophobia. The symptoms were distended nostrils, wild and glassy appearance in the eye, and frothing at the mouth.

Fayette, Tenn.—Considerable loss from what was called murrain. It commenced during the drought of last fall, and is believed to have been caused by the grass becoming too dry to digest properly, and a plentiful supply of water not accessible. The consequence, obstruction, followed by death. There have been no cases where farmers have been careful to keep their cattle loose in the bowels; no remedy where the disease once got a firm hold.

Renville, Minn.—Considerable mortality from drinking bad, stagnant water. A mixture of six parts salt, two parts sulphur, and one of saltpeter, has been found valuable

Meeker, Minn.—During some seasons past considerable numbers of cattle have had swellings on the lower jaw, breaking out into thick ropy discharges for several months. Several deaths have occurred. No name nor cure for this disease has been found.

Hardin, Iowa.—Numerous deaths from "bloody murrain" or "quarter kill." It commenced in the fall of 1871, and was found almost invariably among the yearlings and calves of the previous spring that had become fat on the prairie range. Our correspondent has allowed his cattle the prairie range with his neighbors, and has never lost a single animal by the disease, while every one of his neighbors, *without exception*, has lost a greater or less number. He yards his animals every night, and gives them as much salt as they will consume. This is the only difference in his treatment from that of his neighbors.

Pawnee, Nebr.—A few deaths of animals from roaming in the stalk-fields. Symptoms, the animal refuses to eat; stands from half an hour to two hours; becomes blind; staggers and falls; death within two hours. The *debris* in the manifold or first stomach become nearly dry enough to burn.

Santa Clara, Cal.—Heavy loss from a new disease, the post-mortem phenomena of which are identical with those given in Gamgee's report. At least one-fourth of the farmers have lost more or less. One lost all his cattle and horses. Frequently animals fall dead while eating or drinking, showing no special symptoms.

From Mr. Roger Conant we have the printed report of a committee appointed to investigate the causes of a new disease which has been prevailing to a considerable extent among the cattle in the vicinity of Santa Cruz, Santa Cruz County, California. From this report we learn that the first symptoms of the disease is a desire to rub some part of the body, usually the nose, ear, jaw, leg, or side. The animal uses its feet, or any convenient object, such as a tree, fence, or post, to rub against. The itching seems allayed somewhat by the friction, but soon returns with increased violence, until the hair and skin are quite rubbed and torn off. The parts swell and fill with a serous fluid, as the disease advances. The animal becomes frantic, and dies from eight to twenty-four hours after the first symptoms have shown themselves, apparently from exhaustion. Sometimes they bloat before death. But little de-

rangement of the secretions is noticeable. There is no fever, and the circulation at first is normal, becoming weaker and more rapid toward the last. Several *post-mortem* examinations of cattle dying of this disease were made, but without satisfactory results, as each case seemed to present different features.

The report of this committee was submitted to R. McClure, veterinary surgeon of Philadelphia, who replies that the disease as described is clearly parasitic *(entozoa)* in its character, and is due to picking up from the pasture the tiny *ova* of one or other of the many parasites inhabiting the "unclean hog," as the *cysticercus fasciolaris* and *serratum*, the *trichina spiralis*, &c. When the *ova* of the *cysticercus* of the hog is swallowed by young persons and young animals measles *(rubeola)* is the result in one, and a disease of the brain in sheep and cattle in the other. The disease, then, is the result of swallowing the *ova*, or eggs, of parasites ejected from the hog, giving rise to constitutional irritation, followed by effusions of lymph fluid, or serum into the subcutaneous tissue, and hence the extreme itching, in these cases exhibiting effusion (water) on the brain or at the base of the horn, is merely the partial development of *hydatids hydrocephalus*, sturdy, &c.

DISEASES OF SHEEP.

Foot-rot.—In Orange County, Vermont, foot-rot has prevailed to a slight extent, but increased care and cleanliness have greatly limited its range. In Berkshire County, Massachusetts, two years ago, it infected nearly every flock, but, by culling out diseased animals and by increased care, foot-rot is seldom heard of. In New York it is reported to a slight extent, in Oneida and Onondaga Counties, and in a mild form in Ontario. In Columbia its virulence is declining, and it generally yields to an application of white vitriol. In Yates County, however, it was very destructive, affecting 75 per cent. of the flocks. In New Jersey foot-rot is reported in Hunterdon, Salem, Burlington, and Ocean Counties. In the last-named county the disease yields readily to a weak solution of corrosive sublimate.

In Pennsylvania the disease is reported from Mercer, Warren, Washington, McKean, Lycoming, and Westmoreland Counties, but no increase of intensity is marked. In Washington County it is confined to merinoes. In Warren County it was successfully treated by cleaning and paring the hoof and applying strong muriatic acid. In Kent County, Maryland, the foot-rot has been but slightly prevalent. In Lawrence County, Alabama, foot-rot is mentioned. In Galveston County, Texas, the losses from foot-rot amounted to 10 per cent. In Brooke County, West Virginia, about 12 per cent. of the flocks have been affected with foot-rot. In Hancock County 15 per cent. of the flocks have been affected, but the disease is not nearly so prevalent as in former years. In Logan County, Ohio, but 1 per cent. of the sheep were affected, the disease having been almost exterminated by the slaughter, for pelts and tallow, of the unhealthy animals. In one case five thousand sheep were disposed of, the purchaser returning to the seller the pelts and 5 cents per head. In Medina County, however, half the sheep are affected with foot-rot. In Kosciusko County, Indiana, foot-rot affected about 5 per cent. of the sheep, being confined mostly to a few large flocks of merinoes. In Wayne County a few cases of foot-rot were reported, which, it was thought, would be cured by a change of pastures. In Martin County the merinoes lost 20 per cent. In Lenawee County, Michigan, a few cases were reported, but confined

to sheep kept on low, marshy ground. In Sangamon, Du Page, and Whiteside Counties, Illinois, foot-rot was slight. A few died in Scott County. A few flocks in Jackson County, Iowa, were affected.

SCAB.—The scab has been exterminated from Berkshire County, Massachusetts, by removing affected animals and by greater care of the others. In Chautauqua County, New York, it prevailed among a few flocks, as also in Suffolk and Columbia, but not to so great an extent as formerly. It is also mentioned in Sussex County, New Jersey. In Texas the scab is reported as slight in Blanco, Matagorda, Burleson, Austin, Medina, Bandera, and Hunt Counties. It was more serious in Fayette, Nueces, and Uvalde, and in Kendall it affected full half the sheep in the county. In Bandera it was easily cured by an application of carbolic soap or a strong decoction of tobacco. In Missouri the scab was extensive in Henry County and very severe in Benton, causing the shedding of wool. The loss here is about 10 per cent. In Lawrence 20 per cent. of the flocks are affected; in Caldwell, 25 per cent.; in Clinton, 5 per cent. A few cases were reported in Jefferson, while in Barton scarce five hundred sheep were left, although large flocks of eight hundred to one thousand had been lately imported. In De Kalb no flock was free from the scourge. In Coles County, Illinois, scab had prevailed, but was disappearing. It also appeared in Houston County, Minnesota.

ROT.—The rot is prevalent to some extent in Patrick County, Virginia, and is very severe in Scott County, where the loss is fully 10 per cent. of the flocks. In Currituck County, North Carolina, the loss has been 10 per cent. In Buncombe and Wilkes Counties it especially attacks sheep kept too long in small inclosures or on low, marshy lands. Some losses are reported in Ashe County, and symptoms of the disease in Madison County—copious discharge of mucus and blood from the nostrils, &c. Rot is also reported in Kershaw County, South Carolina. In Georgia it prevailed to a small extent in Chattooga County, and was very severe in Franklin, being aggravated by exposure during an unusually severe winter. In Bibb County, Alabama, 25 per cent. of the flocks died. In Amite County, Mississippi, the loss was 10 per cent.; it also did some damage in Pike County. In Polk, Decatur, Sullivan, and Humphreys Counties, Tennessee, rot prevailed to a limited extent, but mostly among sheep poorly sheltered and fed on corn. In Clackamas County, Oregon, a disease, formerly very destructive, has reappeared in great virulence, threatening to sweep the flocks of that State. Its local designation is "leech in the liver." Its first indications are found in a swelling under the chin, which enlarges till it fills the whole space between the bones of the lower jaw. The animal does not, at first, manifest any special uneasiness, but soon it begins to dwindle and finally lies down and dies. A post-mortem examination shows the liver to be infested with leeches and the swollen parts under the jaw to be filled with water.

GRUB IN THE HEAD.—A few cases of grub in the head are reported from Aroostook County, Maine; Le Grand Isle County, Vermont. Superior care has almost extirpated this with other diseases of sheep formerly prevalent. Slight indications of the disease were observed in Albany and Suffolk Counties, New York, and in Kent County, Maryland. A few sheep died in Kosciusko and Crawford Counties, Indiana. An effective remedy was here found in the injection of tobacco tea up the nose.

DISEASES FROM EXPOSURE.—In Accomack County, Virginia, seven-tenths of the lambs were lost by exposure to the severe weather. One-half the lambs dropped in Sampson County also died. In Morgan

County, Tennessee, exposure brought on a new disease among lambs, the prominent symptom of which was a swelling of the head and throat. It was generally fatal. In Barton County, Missouri, scarce five hundred sheep are left, though large flocks of eight hundred or one thousand have been lately imported. In Alameda County, California, excessive recent storms and scanty pasture have caused an increase of 10 per cent. in the losses of sheep.

MISCELLANEOUS DISEASES.—A case of consumption is reported from Aroostook County, Maine, a large fat ewe dying in four days from the first development of the symptoms. In Washington County, Pennsylvania, a few imported Leicesters were attacked with a chronic cough, which, in some cases, proved fatal. Abrupt change of climate was suggested as the cause of this disease. In New Kent County, Virginia, the losses from distemper amounted to 10 per cent. In Randolph County, North Carolina, a few sheep died from eating too many acorns. In Clay County a third of the sheep under a year old died of some unknown disease. In Worth County, Georgia, 25 per cent. died of an unknown disease, indicated by the following symptoms: The animal stands with its head near the ground and occasionally coughs, while a thick, yellow matter exudes from the nostrils, causing constant sneezing. In Fannin County considerable losses resulted from eating bitter mast. In Suwannee County, Florida, an unknown disease destroyed 10 per cent. The sore-head is reported in Pike County, Mississippi. In La Fourche Parish, Louisiana, there was considerable "swelled throat." In Cross County, Arkansas, an unknown disease, similar to murrain in cattle, destroyed 25 per cent. A few died from the same disease in Humphreys County, Tennessee. In Ohio County, Kentucky, the "blind staggers" prevailed to a limited extent. In Allamakee County, Iowa, there were some losses from brain fever. The deaths were very sudden, and no remedy was devised. Our correspondent in Houston County, Minnesota, reports a disease prevailing in his own flock for eight years. It commences with a few pimples under the fore leg where the wool does not grow. It extends gradually, the skin becoming raw over all the uncovered parts of the body. The ulcers emit a very bad odor. Eight or ten, thus affected, were killed.

DISEASES OF SWINE.

"Hog cholera" is the term indiscriminately applied to diseases of swine generally. A few cases are reported in Westmoreland County, Pennsylvania, among still-fed hogs and hogs confined in filthy pens. The popular remedy here is removal to clean quarters, with free access to rotten wood and bituminous coal. In Baltimore County, Maryland, fifteen hundred died, some farmers losing as many as forty. Much of this loss is attributed to want of proper care. In Rockingham and Rockbridge Counties, Virginia, entire stocks have died in a few localities, but the aggregate loss of the counties is not at all severe. In Scott County the loss is about 33 per cent., embracing some entire stocks. The only known preventive is a mixture of tar and sulphur, fed for some months during the cholera season. In Fauquier County, where the disease was very serious, a mouth-wash of tar, turpentine, and chlorate of potassa were effective. Where hogs had access to coal ashes, salt, sulphur, sulphate of antimony, soap-suds, charcoal, or rosin, no disease appeared. In Buchanan and Surry Counties the loss was 5 per cent. No efficient remedy discovered. It was thought to have been caused by eating poison mushrooms and jimpe berries. Cooked food and tar were relied on as preventives.

Hog cholera prevails in Jackson County, North Carolina, where no remedy is recommended except compulsory extermination of diseased animals. In Randolph County one-fourth of the entire stock were lost. A gill of tar administered in the early stages of the disease was considered a specific. The loss in Buncombe County was 6 per cent., largely brought on by lack of care. In Ash County the loss was 10 per cent. No effective remedy discovered. In Clay County the disease prevailed among hogs less than a year old. Something like "hog cholera" has destroyed 25 per cent. of the hogs of Caldwell County, some stocks losing 50 and 75 per cent. Sporadic cases are reported in Hertford County.

In Clarendon County, South Carolina, on the Santee Swamp, many young hogs have died. In Williamsburgh County some farms have lost their entire stock, but the aggregate loss has not been over 5 per cent.

In Laurens County, Georgia, the loss from cholera was 4 per cent., and a still greater mortality from the "yellow-sweat." Symptoms, a yellow, waxy secretion from the skin; discoloring the bristles, followed by loss of spirits, appetite, and flesh. Great losses are reported in the southern part of Worth County. The animals affected discharged blood freely and vomited dark mucous matter. No specific is relied upon; but common polk-root, fried in grease, is fed to sick hogs. The disease was fatal on some farms in Macon County. Another disease, also called cholera, was destructive. The animals have mange and lice; they grow dull and their bristles turn the wrong way.

In Columbia County, Florida, 25 per cent. died with cholera, and as many more with the "thumps."

In Lauderdale County, Alabama, less cholera than usual is reported. The Berkshire and Essex breeds, lately introduced, are supposed to be of superior hardiness in resisting disease. The cholera prevailed to some extent in Greene and Walker Counties.

In Yalabusha County, Mississippi, 5 per cent. were lost, but by many the loss is attributed to "ticks." In Jasper County there were many deaths from neglect and starvation. Cholera was very fatal in many parts of Lee County. The best preventive is spirits of turpentine mixed with vegetable food. In Clarke County the heaviest loss was from lice.

In Austin County, Texas, the loss was 25 per cent. from different diseases. A swelling and inflammation of the throat was very destructive, causing death from suffocation. Our correspondent successfully treated this disease by burning the skin with a hot iron, producing a counter irritation. He lost half his pigs and shoats by an unknown disease; symptoms, high fever, short breath without cough, death ensuing the second day. In Cherokee County a few cases of cholera occured. In Rusk County many hogs were lost by starvation. In Fort Bend County kidney-worms and mange destroyed 10 per cent. In Upshur County the total loss was a third, mostly from mange.

In Phillips County, Arkansas, a disease arises from eating cockle burrs. In Crittenden County cholera destroyed 5 per cent., and lice a still larger number.

In Obion County, Tennessee, there was a loss of 20 per cent.; cholera always prevails in years of a heavy beech-mast. In such cases a worm is found in the intestines 10 or 12 inches long, which sometimes eats its way through the bowels. It is remarkable for its keen, black head. The remedies used are salting, slopping, copperas, alum, and sulphur. In Hickman County the loss was 10 per cent.; when sulphur, copperas, or leached ashes were freely used there was little disease. In Davidson

County cholera was fatal in some localities, but starvation destroyed a still larger number. Probably two-thirds of the sows lost their litters in January and February of this year. In Humphreys County there was a loss of 30 per cent. among shoats, and 25 per cent. among grown hogs. All hogs affected were lousy. Solutions of lye and copperas were given with enough bran to make a mush. Sulphur, charcoal, and coal-tar were also used. External applications of coal-oil, coal-tar, lard and sulphur were effective in destroying lice. No general specific, however, is reported. In Madison County the disease made a clean sweep, and no effective remedy could be devised. Its virulence was attributed to neglect and to access to cotton-seed. In Jefferson County it almost broke up hog-raising. The stock of hogs some years ago in the county was seventy thousand, but now the whole number is between four thousand and eight thousand. In Sullivan County there was a loss of 7 per cent. from swelled throat, thumps, and other diseases, all of which are popularly called cholera.

In Hardin and Christian Counties, Kentucky, the losses amounted to 33 per cent. The loss in Meade and Ohio Counties was 20 per cent., and in Pendleton County, 25 per cent. Ten per cent. loss was reported in Pulaski, McCracken, Warren, and Edmonson Counties, and 5 per cent. in Adair and Boyle Counties. In Marion County 5 per cent. of the hogs died from lice and worms. In Laurel, hogs from without the county wintered upon the heavy mast, nearly all died, but no others. In some counties it was found that hogs allowed free range for roots entirely escaped. The disease raged in Graves County; it destroyed 15 per cent. in Daviess, where it has prevailed ever since 1848. In Breckinridge the losses amounted to 16 per cent.

In Berkeley County, West Virginia, the losses were alarming, amounting to 60 per cent. In Jefferson County the losses were between five thousand and six thousand, valued at $25,000. In Berkeley the affected animals exhibited excrescences on the snout, legs, and other parts.

In the wet lowlands of Hamilton County, Ohio, a few cases of cholera are reported. In Clinton County it was quite fatal, destroying two thousand. In Williams County a new and fatal disease is reported among young pigs; they become stiff and die in twenty-four hours.

One-third of the stock of Gibson County, Indiana, died. Great mortality occurred in Warwick County, all diseases being confounded under the general name of cholera. The hog-raising business is much depressed by heavy losses. In Decatur County the loss was 10 per cent. Alum, sulphur, copperas, madder, black antimony, and saltpeter pulverized and mingled with wheat, oats, or barley, were found beneficial, the mess being eaten with avidity. The losses amounted to 10 per cent. also in Johnson, Wells, Greene, Spencer, Knox, Posey, and Huntington Counties. Losses to the extent of 5 per cent. are reported in Carroll, Newton, and Scott Counties. In Vevay, Switzerland County, a distiller lost $10,000 worth of hogs, but the losses of the farmers were small. In Hamilton County the loss was 3 per cent. In Cass County it was remarked that all of the few losses occurred in the heavy timbered country, and none in the oak openings.

In Wabash County, Illinois, the loss amounted to 10 per cent. Our correspondent lost 60 per cent. The disease is less destructive than formerly in Williamson and Hancock Counties; cooked food and plenty of charcoal has been found a good preventive. In Champaign County a few cases occurred in the timbered section. In Fulton County 20 per cent. of last spring's pigs died. In Sangamon County 20 per cent. died;

and in Coles County 15 per cent., mostly stock hogs, weighing from 50 to 100 pounds each. In Peoria County no cases of cholera are reported, but hogs were dying of a peculiar disease, which commenced with trembling, like a violent chill, after which loss of appetite and stupor supervened; in a day or two the animal became unable to stand, and died in three or four days. One hog, removed from the pen to the sunlight and rain, and dosed with copperas, recovered. His recovery is attributed more to his release from confinement than to the drug. In Alexander County the loss was one-fifteenth. In Morgan County the losses were severe, but the disease did not appear to be epidemic. In Macon, Marshall, and Henderson Counties the loss was 10 per cent. In Menard County the loss of pigs and shoats was 40 per cent., and 20 per cent. among the older hogs. In Wayne County the loss was 20 per cent. In Warren County a third of the young stock hogs died. Quinsy is reported in Bureau County. In the river-bottoms of Pope County the losses amounted to a third of the whole. In Cass, Carroll, and Whiteside Counties the loss was but 5 per cent. Better care is taken of hogs than formerly. In Scott County the losses amounted to 30 per cent., and in Clinton County 25 per cent. In Massac one-twentieth of the hogs died. Our correspondent in Ogle County states that a specific was found in a mixture of eight bushels of lime to a barrel of salt, to which the hogs should have free access.

In Charlton County, Missouri, there was a loss of 40 per cent.; the mortality was especially severe among pigs and shoats. In Holt, Stoddard, Cass, Pettis, and Livingston Counties, the losses were not over 5 per cent.; in Platte, Butler, and Maries Counties, the loss was 10 per cent. In Saint Louis County, some localities lost from 40 to 60 per cent., but the loss of the whole county was not over 2 per cent. An drain County lost 25 per cent. A few hundred hogs died in Polk, Mercer, Lincoln, McDonald, Lancaster, Carroll, and Boone Counties.

In one locality of Kent County, Michigan, 50 per cent. of the hogs died. No other cases reported in Michigan, and none in Wisconsin, Minnesota, Oregon, or California. A loss of 5 per cent. is reported in Nemaha County, Nebraska. The disease prevailed to some extent in Leavenworth, Linn, and Doniphan Counties, Kansas.

Quinsy prevailed in Greene County, Iowa. The losses amounted to 20 per cent. in Warren and Lucas Counties; to 10 per cent. in Tama, Brown, Jefferson, Marion, Dallas, Louisa, Madison, and Clarke Counties; to 5 per cent. in Dubuque and Jasper Counties. In Benton County, 25 per cent. died of cholera, and 10 per cent. of quinsy. In Henry County the loss of pigs and shoats ranged from one-half to two-thirds. Losses were very heavy in Mahaska and Mills Counties.

The only loss from cholera reported from the Territories is one from Iron County, Utah, amounting to 1 per cent.

THE SUGAR-BEET IN SWEDEN.

The following communication to the State Department has been transmitted to this Department by Hon. Hamilton Fish, Secretary of State. As a statement of the progress of sugar manufacture in a very high latitude, and an evidence of the gradual extension of the business into new fields, it will be read with interest in this country:

LEGATION OF THE UNITED STATES,
Stockholm, December 29, 1871.

SIR: Accompanying my No. 50, of May 19, 1870, I had the honor to send to the Department some facts on the manufacture of beet-sugar in Sweden.

Having recently learned that attention was being directed to this important industry in certain of the Northwestern States, where the winter climate is similar to that of Sweden, I thought, inasmuch as the business succeeds here, it would be useful to collect and transmit to the Department the latest information on the subject which Swedish manufacturers could furnish. Accordingly I addressed some inquiries to Mr. J. Franchell, one of the principal proprietors of the oldest beet-sugar factory in Sweden—that at Landskrona—who is thoroughly acquainted with the business, and received from him, under date of the 6th instant, a very full reply, from which I beg to make the following extract:

"The land which we occupy ourselves varies very much in character, say from light, sandy loam to rather stiff clay; both extremes not very propitious to the cultivation of the beet-root, but the greater part consists of rich loam, very suitable to the purpose. The whole of the land, about 1,800 tunn, (say 2,000 acres,) has been drained with pipes, 4 to 4½ feet deep, and cultivated to the depth of 16 to 18 inches.

"Through the liberal application of stable manure to the cereal crops, and artificial manure, chiefly super-phosphates and potash, the latter derived from burning the residue of the beet-root molasses used in the spirit distillery, to the root and leguminous crops, the land is now brought to a high degree of fertility. In land brought into this state there will, of course, always be a good deal of soluble saline matters, but our land does not contain such matters in excess, or in a degree to act injuriously to the quality of the beet.

"On our principal farm we use a five years' rotation, say, 1, wheat and rye; 2, beet root; 3, barley and oats; 4, clover (seed is sown with the barley) and mixed grain; 5, clover and green crops; consequently the beet-root only returns every fifth year. Having, however, some reason to suspect that the cultivation of beet-root and clover in so short a rotation is not favorable to the former, we have adopted, as a trial, on a small farm, a four-course rotation, say, 1, wheat and rye; 2, beet-root; 3, barley and oats; 4, green crops, clover being entirely excluded. Fifteen to seventeen tons per tunnland (1.22 acres) may be considered an average crop.

We pay 80 öre per centner, or about 21*s.* 4*d.* per English ton delivered at the works at the time the harvest is made; but growers who keep the beets until wanted at the works are paid a few öre more, according to the time of delivering. At 80 öre, the gross income, calculated on the above-mentioned weights, will be 288 to 326 rix dollars per tunnland, and the cost of cultivation may be reckoned, in round numbers, at 100 rix dollars per tunnland. [At this rate the profit of growing beets would be from $45 to $55 per acre in gold.] We have hitherto experienced no particular difficulty in protecting the beets from frost. They are not put in pits, but on flat land, in small roof-like heaps, containing five or six wagon loads, and protected at first with only a thin covering of earth to prevent overheating, which is very injurious to the saccharine matter, but later in the season with a thicker covering up to, in all, 24 inches, according to the length of time the heaps are expected to remain in the field. [To the question, 'How many months of the year is the factory occupied in making beet sugar?'] Generally from the commencement of October to the beginning or end of February. The remaining part of the year is occupied in refining beet-root and colonial sugar. During the autumn and winter months the beet roots give the best results, and they deteriorate rapidly in February and March.

"As we not only manufacture beet-root sugar, but also largely refine beet-root and colonial sugar, it is rather difficult to state exactly the amount of profit on the beet-root manufacture; but this manufacture, being at present exempt from all duty, the import duty on colonial sugar being 1*l.*, English, per cwt., it must be exceedingly profitable if carried on where the circumstances are naturally favorable. The refuse is a most excellent food, and we use it largely both for fattening cattle, milch cows, and sheep. It is mixed with cut straw and put in a heap for about twenty-four hours, to acquire some heat, and it is then eaten with avidity.

"The success of the beet-root business must, in the long run, entirely depend on the quality of the beets, and also on climatic influences. Exceptional circumstances, such as, for instance, exemptions from duty, may, of course, enable this business to be carried on tolerably well, even with inferior beets, and under an unfavorable climate, but it may be subject to doubt whether such business can be considered legitimate, and be able to hold out in competition with the foreign manufacture when the duties shall be measurably equalized. Eleven or twelve per cent. may be considered the average of sugar in the beet juice in this part of the country. This year the beets are rather above the average quality, but of course they vary a good deal, according to the mode of culture and state of the weather during the period of growth.

"The seed is always sown by us on the field direct, and I do not believe that at present transplanting is anywhere resorted to. In sowing by hand, which is a good deal practiced both here and in Germany, the field is rolled very evenly, the earth being in a high state of pulverization, and then the rows, lengthwise and across, marked out with a marker like a colossal hand-rake. By means of a small hoe, with a handle about 12 inches long, a hole about one inch in depth is made in each cross, four or five

seeds therein deposited, and the earth replaced and gently pressed with the back of the hoe. The sowing by hand is considered to have several advantages. The plants then grow up in a small bush, thereby easier penetrating the crust which may have been formed by heavy showers of rain, and protecting each other in case of rough weather during the early period of vegetation. The rows can then be made narrower, which is considered favorable to the development of the sugar, but it requires a great deal of labor; but during the last few years, having found it more difficult to supply the necessary labor to the large breadth cultivated, we have largely, and with very good success, made use of machines both for sowing and hoeing. In sowing by hand the plants generally have a distance of 12 inches each way, but in sowing by machine the rows have a distance of 16 to 18 inches, and the distance between the plants in the rows 9 to 10 inches. We principally use Ganet's common drill machine, not having found the Dibble machines quite practical. The quantity of seed used per tunnland is 18 to 20 pounds with hand sowing, and 22 to 25 pounds when sown by machine.

"The beet-root requires rather a long period of growth for getting fully ripe. The land, having been plowed deeply in the autumn, is prepared in the spring as early as the state of the weather will permit, by us generally in the early part of April, and the sowing performed during the latter half of that month, or, under less favorable circumstances, in the early part of May. The crop is not ripe before the early part of October. The harvest comes on in the course of that month, being hardly finished before its close, or the first days in November.

"I am not aware of any important improvements in the art of manufacture during the last two years, but I believe that several minor improvements have been introduced in the manner of working the new system of extracting the juice by diffusion with water, a system which, during the last few years, has excited a great deal of attention on the part of manufacturers of beet-root sugar, and appears on the whole to give great satisfaction.

"The method of analyzing the juice in general practice is the same which is generally adopted in Germany. It is weighed at a temperature of 17½° C. by the saccharometer of Brix, and then polarized by the instrument of Soleil-Wartzke, with improvements by Dr. Scheibler, to arrive at the proportion of crystaline sugar contained in the juice. The difference between the degrees observed on the saccharometer and those on the instrument of polarization is considered as impurities, and is called 'no sugar,' and the proportion in which the latter degrees stand to the former is decisive of the quality of the juice. Thus, if the saccharometer marks 14° and the polarization gives a result of 11°.5, the difference, 2°.5, is 'no sugar,' and the quotient being 82.14, indicates the relative quality of the juice for sugar-making purposes. The beet-root crop of this year has not turned out quite so abundant as last year, chiefly owing to the cold and unpropitious weather in the spring, by which field operations and vegetation were very much retarded, but the quality of the beet is considered superior to that of last year's crop.

"There is at present a very active movement in this country with regard to the beet-sugar business, and a very remarkable thing is that this activity appears to have been stirred into life by the impending taxation of the manufacture. For a number of years our factory was the only one in the country, but as soon as a proposal had been made in the Diet of 1867 to put a duty on indigenous sugar, a proposal which, in a modified form, was ultimately carried in the Diet of 1869, a new vigor seems to have been infused in the business, and, besides ours, there are now at work one factory in Stockholm, one near Malmo, one at Halmstad; and two are in course of construction, one at Wadstena, which is expected to get to work in January, and one near Ystad, which will not commence operations before next autumn. The factories at work will probably this year consume 700,000 to 750,000 centners, Swedish, of beet-root, (say 30,000 English tons,) and I think a rapid increase in this quantity may be looked for. A great advantage to those who now establish factories is that they can profit by the long, dearly bought, and widely extended experience of other countries, and construct their works according to the most approved system.

"Possibly Sweden enjoys a certain advantage over some of the interior and Northwestern States of the United States, in being able to receive shipments direct by sea of colonial or West India sugar, the refining of which occupies the factories while they are not engaged on beet-root sugar.

"The Diet three years ago provided that a tax should begin to be applied to white beet sugar in 1872, at the rate of 2 öre per skålpund, (about one pound,) at which rate it is to remain for three years; the next three years following it is to be 4 öre per skålpund and so on increasing 2 öre per skålpund every three years until it reaches 8 öre (say 2¼ cents) per skålpund, at which amount it is to remain; which is four-fifths of the present duty per skålpund on colonial raw sugar up to No. 18, Holland standard.

"I have several times visited the factory at Stockholm, and every facility for acquiring information as to its operations has always been courteously afforded to me. It was established in 1869, with a capital of $111,000, (gold,) which paid for some land.

the new factory buildings, and the machinery. Cost of machinery, $67,000. Capacity of the factory, 10,000 tons of beet root per season. None of the owners were practically familiar with the business, and some loss has been sustained from lack of proper management. The proprietors, however, have full faith in its success, and are investing considerable capital in one or more new factories. They were led to expect, this season, a supply of 10,000 tons of beets, but got something less than half that quantity; and the beet 'campaign' lasted only one-and-half months. The beets were of excellent quality, and those who grew them have *cleared* about $100, gold, per acre. The danger of frost before the beets are fully ripe is a difficulty to be met with here.

"The factory at Landskrona and at Stockholm together, in 1870, manufactured one and a half million pounds of beet sugar, of the value of $180,000, besides molasses, of the value of $5,000.

"It is well known to what a high standard agriculture has been carried in England. And yet Mr. James Howard, the distinguished English agriculturist, ascertained by personal observation of sugar-beet growing in France *that the profit on the crop was far greater than upon any crop grown in England;* and he so expressed himself in 1868, in a note to the president of the Royal Agricultural Society of England, in which he recommended the sending of a deputation to visit the best farms on the continent.

"In 1869 Mr. Howard made an extensive tour on the continent, particularly to acquire information on this subject, and in 1870 published the result of his observations, in a highly interesting and instructive volume of about 100 pages. In France he visited several farms, which had taken the premium of honor (valued at $1,600) in their district, and which, he says, are exerting a quiet but powerful influence in their respective neighborhoods. Among these was a farm at Lens of 1,200 acres, of which 500 acres were in beet root, all on ridge, without a single blank spot; the yield estimated 18 tons per acre. The land had been plowed 16 to 18 inches deep. There had been a sugar-factory on the farm for many years. Another farm near Tours had 1,250 acres of beet root, beautifully cultivated, the rotation being, 1, wheat; 2, beet root; 3, clover. At Chassart, near Fleurs, in Belgium, on a farm of 1,500 acres, he saw one splendid field of sugar-beet of 175 acres, which was estimated at over 20 tons an acre. He shows that, owing to the influence of sugar-beet factories in Belgium, the annual rent of farms have risen to, in some cases, $17 per acre. The Rhenish beet-root sugar company at Cologne have a farm of 7,200 acres. They pay the surrounding farmers 20*s.* per ton for beets, and give back the pulp free, the average price of which, on the continent, is 13*s.* per ton. He was shown the debtor and creditor account of a beet-sugar factory, which manufactures into sugar between 13,000 and 14,000 tons of roots per annum. The total expenditure, exclusive of the interest upon the money embarked, was $94,000; the total receipts about $160,000, leaving $66,000 per annum for profit and interest on capital.

"There must now be over a thousand beet-sugar factories in Europe.

"While both the manufacture of beet sugar and the growing of the beets are seen to be profitable, it would seem, however, that the *peculiar advantage* of the industry to a country is its *influence in diffusing a skillful practice of farming* and of promoting agriculture in general. To show the appreciation in which it is held in France, Mr. Howard states that, at an agricultural meeting held a few years ago at Valenciennes, a triumphal arch was erected, on which appeared the following inscription: 'The growth of wheat in this district, before the production of beet-root sugar, was only 976,000 bushels; the number of oxen was 700. Since the introduction of the sugar manufacture the growth of wheat has been 1,168,000 bushels, and the number of oxen 11,500.'"

As to the steps that will promote this business in the United States, I would submit that, before any one would be willing to invest capital in starting a factory in an untried locality, he would wish to ascertain whether the soil in the neighborhood will produce beets having a sufficient percentage of sugar in the juice to make it profitable. Doubtless this essential fact can be ascertained by growing the beets on different farms a couple of successive seasons. Some person, who purposes trying the manufacture, should see to procuring seed in time and to its distribution, with instructions as to the best manner of growing. He should also make arrangements in season for having the beets analyzed at some beet-sugar factory promptly after they are ripe, and for their careful collection, labeling, and transportation to the place of analyzing.

It seems as if it would be for the interest of some of the land-grant railroad companies to cause experiments to be made as to the adaptability of their lands for sugar-beet growing.

Where a factory is to be established by persons unacquainted with the art, practically, it is of the highest importance, of course, to procure for manager a faithful as well as competent person. It sometimes happens that men are recommended for situations to get rid of them. And I would suggest, as the best plan, that, in case the proprietors of any new beet-sugar factory in the United States need to send to Europe for a manager, they apply to the *government* of the country from whence they expect to obtain him, through the good offices of the Department of State.

Hoping the success which attends this industry in Sweden will help to encourage its increased development in the United States, I have the honor to remain, very respectfully, your obedient servant,

C. C. ANDREWS.

Hon. HAMILTON FISH,
Secretary of State, Washington.

ENTOMOLOGICAL RECORD.

BY TOWNEND GLOVER, ENTOMOLOGIST.

THE CABBAGE-MOTH.—Complaints have been made by correspondents in New York and New Jersey of injuries done to cabbages in the autumn by the attacks of a small, green caterpillar, that eats holes in the outer leaves, sometimes riddling them like a seive. The caterpillar is about 0.35 of an inch in length, cylindrical in form, thickest in the middle, and of a green color. The moth produced from it was named *Plutella limbipunella*, by Clemens, (Fig. 5,) and is described by Dr. Fitch in the New York State Agricultural Report for 1853, page 874, as the cabbage-moth, *Cerostoma brassicella*, and is closely allied to, if not synonymous with, *Plutella zylostella*, Linn., in Europe; and if so, is another imported insect. When disturbed, this caterpillar drops from the plant, but suspends itself by means of a silken thread. There are at least two broods in one season in the more southern States. In the fall of 1870 it was very plentiful in parts of Maryland, riddling the cabbages very seriously. The pupa is formed in a beautifully constructed cocoon, woven of silk-like delicate open net-work on the leaves, and remains a pupa in the cocoon only a few days. The perfect insect is a small moth, with the upper wings of an ash-gray color, freckled on the disk and apex with black dots, and having a white stripe on the inner margin; the under-wings are ash-gray.

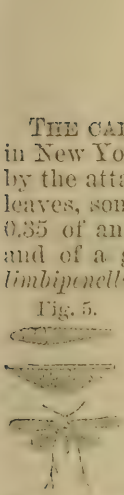


Fig. 5.

Washing or syringing the plants with whale-oil soap-suds or strong solutions of tobacco-water would no doubt be of use, if they did not give the heads a disagreeable flavor, or if the cabbages were subjected to a thorough washing before using. The insect is subject to the attacks of a minute ichneumon fly; and the two spiders, *Theridion brassicæ* and *hypophyllum*, mentioned by Dr. Fitch in his last report in connection with the white cabbage butterfly, will also, no doubt, be of service in destroying the small caterpillar.

CHEMICAL NOTES.

BY RYLAND T. BROWN, CHEMIST.

The laboratory is now employed in the analysis of commercial manures, with a view of determining the relative value of these commodities, that those who purchase and use them may have something to guide them in their choice. These analyses will appear from year to year in the annual report of the Department. But little work, other than this, has been done since the last report, and of that little scarcely any is of sufficient general interest to justify publication. A specimen of calcareous

tufa, (commonly called marl in the West,) was forwarded to the laboratory by S. W. Randall, of Joliet, Illinois, and we subjoin its analysis because such deposits are quite common in the calcareous and drift regions of the Northwest.

Carbonate of lime	81.43
Sulphate of lime	4.21
Earthy matter, insoluble in hydrochloric acid	12.02
Water, determined at 100° C.	2.34
	100.00

Mixed with muck or barn-yard manure, this substance will have the effect of mild lime. Where fuel is cheap it may be made more active by burning it as lime is burned.

Sulphur in mineral coal—Ohio limestones.—Professor Wormley, in a paper appended to the Ohio Geological Report for 1870, gives an interesting account of the chemical composition of the mineral coals and limestones of that State. Without any very accurate determination of the fact, it has heretofore been assumed that the sulphur in bituminous coals exists in combination with iron in the form of ferrous sulphide, but the investigations of Professor Wormley prove conclusively that this is not the case, at least so far as the coals of Ohio are concerned. In all his investigations a large redundancy of sulphur over the quantity of iron necessary to convert it into a sulphide was found. The experiments detailed on the heating properties of different coals are very interesting. Science can hardly do a more important service, at the present time, than to determine how much heat can be produced by the combustion of a given weight of coal of the various qualities. This paper reports that all the limestones of Ohio contain magnesia, though in very different proportions. The blue limestone (Trenton) has 5 per cent., the Clinton 12, the Corniferous 28, and the Niagara 35. These facts are important in an agricultural point of view, but we regret that the professor did not determine the proportion of phosphate of lime in these several qualities of stone. The permanent action of lime as a manure depends much on the quantity of phosphoric acid it may contain.

Artificial water-lime.—It has been long known to chemists that water-lime consists substantially of quick-lime, burnt clay, and a small portion of the oxides of iron and magnesia, but scarcely any effort has been made to utilize this knowledge. All yellow or red clays contain iron, and most specimens of lime in use contain the required magnesia. If burnt clay or brick-dust in fine powder be mixed with an equal weight of fresh slaked lime and twice this weight of clean, sharp sand be added, a compound will be formed which will harden under water equal to the best hydraulic cement.

Germination—its relation to light.—The theory of the germination of plants, which has been heretofore admitted, requires that the germinating seed be excluded from direct sun-light. Late experiments appear to establish the fact that, while exclusion from the luminous rays of the solar spectrum is necessary to the healthy germination of seeds, yet the chemical or actinic rays are indispensable to that process. These penetrate much deeper into the soil than do the luminous rays. The exclusion of the chemical rays, and not the absence of oxygen alone, is assumed to be the cause of seeds failing to grow when buried too deeply in the earth. Will our agricultural colleges settle this question

by careful experiments? Let us have all that can be known of the mysteries of plant-life.

CARBOLIC ACID AS A DISINFECTANT.—C. Homburgh, of Berlin, proposes to use carbolic acid as a disinfectant, by saturating sheets of Bristol-board, or any thick spongy paper, with a solution of carbolic acid in water. The paper, in pieces of any convenient size, may be hung up in the room to be disinfected, or may be placed in drawers or wardrobes, where it is desired to protect clothing from moths or other insects. This suggests a convenient method of using this excellent disinfectant and insect destroyer.

AVAILABLE NITROGEN.—P. P. Deherain (in *Comptes Rendus*) advances a somewhat novel theory of the reduction of atmospheric nitrogen to an available form for the support of plant-life. He endeavors to prove that the free nitrogen of the atmosphere is brought into combination during the oxidation of organic matter in the soil. To demonstrate this he dissolves glucose in a dilute solution of ammonia in water placed in a large flask filled with a mixture of equal parts of nitrogen and oxygen. Having closed the flask, he heats the mixture gently for one hundred hours, at the end of which time the whole of the oxygen has disappeared, and 5.9 per cent. of nitrogen has been taken up. The same process with humic acid and potash shows a loss of 7.2 of nitrogen. If these results are confirmed by subsequent experiments, they will throw light on the hitherto obscure subject of the production of nitric acid.

FORMULÆ FOR FERTILIZERS.—M. George Ville, in the *Journal d'Agriculture Pratique* for February 22, 1872, gives the following formulæ of chemical manures at present in use in France, with the modifications which he proposes to introduce, to which he appends the prices of the several ingredients used in the compound, both in the old formula of 1868 and the new of 1871. By way of explanation to some of our readers, it may be proper to say that a kilogram is equal to 2.204737 pounds—a franc is a value of 18.6 cents, and a hectare is a land-measure of 2.4711 acres.

Old formula for clover and hay.

Acid phosphate of lime	400 kilograms =	64 francs.
Nitrate of potassa	200 kilograms =	124 francs.
Sulphate of lime (plaster)	400 kilograms =	8 francs.
		196 francs.

Cost per hectare = 196 francs, or $36.45.

For which he substitutes the *new formula* with the prices of 1871 appended:

Acid phosphate of lime	400 kilograms, worth	52 francs.
Chloride of potassium	200 kilograms, worth	50 francs.
Sulphate of lime	400 kilograms, worth	8 francs.
		110 francs.

Cost per hectare = 110 francs = $20.46.

For clover or Burgundian hay, M. Ville says he does not hesitate to recommend the chloride of potassium as a substitute for the nitrate, but for cereals (wheat, rye, barley, &c.) it is necessary to supply nitrogen in some available form, and for this purpose he uses the sulphate of ammonia as in the following formula:

Acid phosphate of lime	400 kilograms, worth	52 francs.
Chloride of potassium	200 kilograms, worth	50 francs.
Sulphate of ammonia	390 kilograms, worth	195 francs.
Sulphate of lime	210 kilograms, worth	4.20 "
		301.20 frs.

Cost per hectare = 301.20 francs = $54.52.

By the term "acid phosphate of lime" we suppose the author means bone meal or ground mineral phosphate of lime, reduced to a soluble form by the addition of half the weight of sulphuric acid.

The Feuilleton du Journal des Débats of February 7, 1872, gives an account of several institutions throughout Germany, France, Italy, and other parts of Europe, which are said to render very great and efficient service to agriculture. They are styled agricultural stations, and have for their object the promotion and diffusion of agricultural science, and the protection of practical farmers from frauds practiced upon them by dealers. To attain this object they devote themselves to the prosecution of different experiments in vegetable and animal physiology, the analysis of soils and fertilizers, and all the different products which are presented to them by the practical husbandman. They have a double mission imposed, that of being both theoretical and practical; they must work up the scientific theories and discoveries and put them in such a shape as to be understood and utilized by farmers. A much better idea of their object will be conveyed by giving the different heads into which M. Grandeau has grouped the work pursued by the different stations. They are as follows:

1st. Researches and experiments upon the production of vegetables and animals. The word production is here taken in its broadest sense. It comprehends at once the researches upon the different branches of animal and vegetable physiology, zootechny, physiological chemistry, and vegetation meteorologically considered.

2. Informal lectures involving the principles of agricultural science, and communicating results of work in field and laboratory.

3d. Publication of the successful labors of the several stations in annual or periodical reports.

4th. Special researches and analyses of earth, water, and fertilizers, for their peculiarities.

Further, there are stations which devote themselves to examinations not less necessary than those of fertilizers, viz: that of seeds. The stations devote themselves to the study of the laws which regulate the development of all organized beings. But, says M. Grandeau, in order to do this with success they should not only be provided with sufficient means and material, but should also be directed by men of tried capacity, versed in the knowledge of the natural sciences, and prepared by special studies for the accomplishment of the important mission confided to them. In the last connection, he says one should not undertake this without the expectation of repulse. In the beginning all the stations devoted themselves to the general study of animal and vegetable physiology, but finding the field too comprehensive, they concluded that it would be much more profitable to make a division and specialization of the work. After that they each, having a particular subject assigned them, occupied themselves with different branches. Thus the stations of Weisbaden and Kloster-Neubourg devote themselves to grape culture and wine manufacture; those of Brunswick and Mariabrunn to wood culture; those of Gerze to silk culture. The sta-

tion of Lodi devotes itself to researches upon the manufacture of cheese: and those of Parvi to the study of cryptogamic botany.

The author begs leave, in order to convey a more perfect idea of this great labor enterprise, to make some extracts from the programmes of researches prosecuted at the different stations. The following are some of the questions to the solution of which the stations of Kuschen and Proskow will devote themselves during the current year:

1st. Essays upon culture in aqueous solutions relative to the assimilation of ammonia, urea, and hippuric acids.

2d. Experiments upon the amount of water evaporated by different plants.

3d. Researches upon the influence exerted by the volume of earth upon the development of different plants.

4th. Trials on the culture of plants and of new varieties.

5th. Trials of different manures, having for their sole object the determination of the different combinations of nitrogen.

6th. Estimation of the richness of stubbles and roots in mineral matter and nitrogen.

7th. Researches upon the mixed seeds of the red clover, of Lucerne, or Burgundian hay, of esparcette, and the grasses.

8th. Researches upon the digestibility of stubbles, the nutritive elements contained in young clover, old clover, and in Lucerne hay.

9th. Researches and experiments upon the different modes of the preparation of hay.

10th. Comparative researches upon the utilization of the nutritive elements of Lucerne as it is usually prepared, and of brown.

11th. Researches upon the feeding of dry clover with the addition of different nutritive substances.

The stations publish every year the programmes of their researches and experiments, and very materially enrich science with many valuable discoveries. But their popularity is chiefly due to the analyses of fertilizers and the controlling influence they exercise over their trade. The prices of analyses are fixed, by the founders of these institutions, sufficiently low to encourage customers, and yet cover the expense and leave the station a small allowance. This prevents the sale of worthless material by dishonest manufacturers, and protects the honest dealers as well as the farmers who use the productions.

In France this abuse by manufacturers of fertilizers became so great, and so burdensome to agricultural industry, that they endeavored to prevent it, and founded laboratories charged with the examination of commercial fertilizers. Among these laboratories that of Nantes, conducted by M. Bobierre, has rendered the greatest service to agriculture. But unfortunately they are not sufficiently numerous to be everywhere efficacious in aiding the husbandman. The agricultural societies therefore decided that analytical laboratories should be established in every district. They further demand that information shall be given to the minister of agriculture concerning the exact state of the soil which they cultivate, and the nature of the fertilizer used upon it.

The method of inspecting commercial fertilizers practiced throughout Germany is conducted in the following manner: After the manufacturer has prepared a certain quantity of the fertilizer, the chemist goes to him unexpectedly, has him weigh in his presence the sacks destined for sale. He then takes a quantity which he deems necessary, makes an analysis of it, and publishes its composition.

But there are stations devoted to the investigation of a matter equally important with that of fertilizers. It is the examination of the differ-

ent seeds offered in large quantities in the markets. The imperfect and foul seeds which they very often contain make them a source of great annoyance to the planter. The examination of seeds, therefore, is highly beneficial. The stations provide experts who continually carry on these examinations of all the seeds offered for sale, which, if they are bad, they condemn, and publish the amount of their adulteration. To show the great importance of this measure, as well as the very great extent to which these adulterations are carried, it is stated that Mr. James Buckman, formerly professor in the agricultural college of Cirencester, England, who is occupied with the examination of different seeds, found that certain specimens of red clover of commerce contain from 7,000 to 8,500 grains of foul seeds per liter. Specimens of white clover showed 125,000 to 213,000 grains of strange seeds per liter; while in an equal quantity of carnation clover, guaranteed pure, he discovered 43,500, and in ray grass of Italy, 430,800.

Mr. Charles S. Bigge found in his determinations upon the germination of seeds that in different specimens of carnation clover the number of grains which grew varied between 18 and 68 per 100; white clover furnished 42 to 48 per cent. of good grains; the ray grass of England, 22 to 24 per cent.; and he found that in a specimen of ray grass of Italy only six retained their germinating faculties. Other instances of adulteration and presence of foul and useless seeds in the articles offered in commerce were cited, but enough have been given to show the enormous extent to which this evil is practiced, and the very great value to the farming community of this branch of investigation.

All the researches and experiments of the stations are very thorough and complete, and therefore of almost infinite value to the practical farmer. This fact, together with the vast amount of valuable information which they render to the scientific world, should favorably recommend their establishment in every section where agricultural industry is practiced.

FIRST WORDS OF THE BOTANIST.

By George Vasey, Botanist.

The present botanist of the Department having but just entered upon his duties, no extended report of operations is possible.

A great amount of work has been accomplished by my predecessor in putting up and arranging the botanical collections of this Department. A large portion of these are distributed in the cases, on appropriate shelves, numbered in order from 1 to about 200, corresponding to the natural orders. Large quantities of specimens yet remain in packages, awaiting examination and distribution, and the mounting of such as are not yet represented in the general herbarium.

Here are deposited the botanical collections of the different exploring expeditions of the Government, together with the numerous private collections which have come into its possession. Here should be a representative of every species of plant growing within the United States, and, as far as practicable, of the plants of other countries. Although a large portion of these specimens have but little popular interest, they are of great value to the cause of science, as showing the relationship between different families of plants, recording their geographical range and distribution, and furnishing a means of comparison

and recognition of such plants as are often sent in for identification. Thus, specimens of grasses and forage plants are frequently sent to this Department by farmers and others on account of some special qualities of excellence or adaptation to the peculiar conditions of some location in which they have been observed to grow.

In connection with the ordinary botanical specimens, it would seem to be highly desirable to have a more complete representation of all our native forest-trees, in the form of sections of the trunk or body of the trees, in such form as to illustrate the natural appearance both of the bark and of the wood—a section of the wood being also polished, to show the quality of the grain and its adaptation to mechanical purposes. Such a collection, properly prepared, would prove of great interest not only to science, but to practical agriculture and mechanics, and would tend to show how rich are our native forests in the variety and value of their trees for various purposes in the arts and manufactures.

This feature of the work would also have a practical bearing upon the important questions now agitating the public mind, viz: The preservation and perpetuation of the forests of the country. Every means possible should be employed to diffuse information on this subject, and thus promote national wealth and prosperity.

Another object of great importance to the country is the diffusion of information respecting the vegetable or fungoid diseases which affect many of our most valuable agricultural products. Our grains, our orchards, and vineyards in many localities are suffering from the ravages of blight, mildew, mold, rot, or other fungous parasites. These require investigation, in the expectation that a full knowledge of their nature and habits of growth will enable us to discover means of arresting and controlling their progress.

In conclusion, I will express the hope that the value of this collection to the cause of science will not be overlooked.

To a casual observer there may not appear any connection between the multitude of specimens arranged in the cabinet of the naturalist and the cause of agriculture. To the inexperienced hundreds of these specimens appear identical. But all intelligent persons are aware that it is only by virtue of an intimate knowledge of the multiplicity of forms which crowd every department of science, and of the relations and affinities which they sustain to each other, that the specialist is enabled to recognize and classify the various objects which come to his attention. It is this special knowledge which enables the botanist to recognize a new grass or other plant, and to judge what may be expected of it as an object of cultivation.

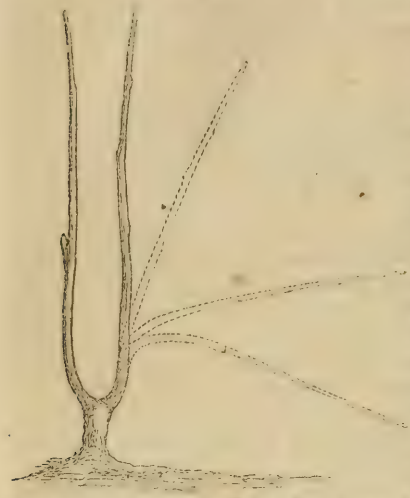
Indeed, at the present day, it cannot require much argument to show the influence of science on mental culture, and consequently on national elevation, in other respects than those which relate to immediate pecuniary profits.

SCIENTIFIC NOTES.

INCREASING THE VIGOR OF GROWTH IN PLANTS.—A very important announcement has lately been made in France as to the effect produced upon the luxuriance of vegetation by the disturbance of the natural position of the branches. It has been known for some time that if two branches of a fruit-tree be selected of about the same size, and the same

upward inclination to the horizontal plane, and one of these be bent downward toward this plane, it appears to lose its vigor, while the other gains in a like ratio. It is now announced as the discovery of an ignorant peasant on the Danube, named Hooibrenk, that this law holds good only up to the horizontal position; and that if the branch is depressed still further, and below the horizontal, it becomes characterized by much greater vigor than before, and, in fact, will put out leaves and branches to an astonishing and unheard-of degree. But this depends upon keeping the branches as nearly as possible in a straight line, the effect being measurably lost with a considerable curvature. In this case, only the buds which occupy the top of the arc are developed completely, at the expense of the rest, which remain in their original condition, contributing neither to the extension of foliage nor of fruit. (The successive positions of the branch are illustrated in the accompanying cut, Fig. 6.)

Fig. 6.



Duchesne-Toureace, in communicating these facts to *Les Mondes*, attempts to show the causes which seem to determine so great a flow of sap to the branches inclined below the horizontal line, and thinks that the explanation is to be found in the establishment of a siphon arrangement, by means of which the juice is carried over the bend from the main stem in excessive flow. Be this as it may, the fact remains, as illustrated by an experiment prosecuted by this gentleman. In early spring, when the sap was running in the vines, he took four plants of about the same size, and trimmed them so as to leave one stem to each, these being arranged vertically, obliquely upward; horizontally and obliquely downward. He then cut off the stems, and collected and measured what exuded, and found the amount from the branch inclined downward was more than three times greater than that from the others.

MURRAIN IN CATTLE.—The subject of murrain in cattle has of late years received a good deal of attention, and little by little we are acquiring more definite ideas in regard to this disease, as well as to its influence upon the healthfulness of the milk and flesh of the animal. The experiments of Chauveau have shown that tuberculosis of cattle is transmissible; that is to say, by bringing sound cattle in communication with those that are diseased, similar tubercles become developed in the former, or, in other words, they become afflicted with murrain, which is only another name for tuberculosis.

The investigations of Professor Klebs, in Berne, have shown still further that the transmissibility of the disease is not limited to cattle, but may also extend to other animals; indeed he has been convinced that the human tubercles are equally transmissible with those of cattle, and that murrain in cattle owes its origin to the same infectious material as the human tuberculosis. Thus, certain Guinea pigs having been fed with the murrainous matter, were infected with it, and others, treated with the tuberculous matter from man, exhibited the same result.

Again, murrain has been produced in cattle from feeding or inoculating with the human tuberculous matter, and hence it follows that the tuberculosis is transferable from cattle to man, and it appears highly important that murrainous animals should be carefully watched, and that inspection of their meat should be very strictly attended to.

Professor Gerlach, of Hanover, has lately prosecuted additional experiments upon murrain, and has established not only its transmissibility by inoculation, but also has shown, by numerous experiments, that tuberculosis can be transferred by feeding with the milk of murrainous cattle. As conclusions from the facts ascertained by him, Professor Gerlach remarks that, up to this time, murrain has been looked upon, in a sanitary aspect, as an innocent disease, but that it must hereafter be considered as quite the contrary. In former times, or toward the end of the last century, the murrain of cattle was considered as a kind of venereal disease, and while this view lasted great caution was observed in regard to the flesh and the milk. Since it has been ascertained, however, that this is not a syphilitic condition, the meat has been considered as wholesome. This is now known to be an entirely erroneous assumption, and the greatest possible care should be taken to avoid using the meat or the milk in any way.

Influence of food upon poultry and eggs.—The influence of the food of poultry upon the quality and flavor of their flesh and eggs has not generally been taken into consideration; but it is now well ascertained that great care should be exercised in regard to this matter. In some instances it has been attempted to feed poultry on a large scale in France on horse-flesh, and, although they devour this substance very greedily, it has been found to give them a very unpleasant savor. The best fattening material for chickens is said to be Indian corn-meal and milk; and certain large poultry establishments in France use this entirely, to the advantage both of the flesh and of the eggs.

Source of nitrogen in plants.—It is well known that the quantity of nitrogen contained in the crops exceeds in enormous proportion that existing in the manures, the excess undoubtedly being derived from the air. It is now a question whether this is extracted directly from the air by plants, which would thus have the power of assimilating directly, or if it is first taken from the air by the soil, so as to combine with organic matter, and form an assimilable compound. According to Deherain, oxygen, in the presence of organic matter, combines directly with nitrogen to form a compound analogous to the humus of the earth, or to ulmic acid. To illustrate this he placed in a tube oxygen, nitrogen, glucose, and ammonia. On drying the tube and heating it, a black nitrogenized matter was left, and a portion of the nitrogen in the tube was found to have disappeared.

Preferences of climbing plants.—According to Mr. Henry, certain climbers evince a partiality for some particular species of plants, stretching out their tendrils and branches so as to come in contact with them, while to other species they have as decided an aversion, avoiding them, and never becoming attached to them, though they run up the surface of the wall side by side.

Powdered coal for unhealthy plants.—In a communication, addressed to the *Revue Horticole*, the writer states that he purchased a very fine rose-bush, full of buds, and, after anxiously awaiting their maturing, was greatly disappointed, when this took place, to find the flowers small, insignificant in appearance, and of a dull, faded color.

Incited by the suggestion of a friend, he then tried the experiment of filling in the top of the pot around the bush, to the depth of half an inch, with finely pulverized stone-coal. In the course of a few days he was astonished at seeing the roses assume a beautiful red hue, as brilliant and lively as he could desire.

He tried the same experiment upon a pot of petunias, and soon after all the pale and indefinite colored ones became of a bright red or lilac, and the white petunias were variegated with beautiful red stripes. Some of the lilac petunias became a fine dark blue. Other flowers experienced similar alterations; those of a yellow color alone remained insensible to the influence of the coal.

REGULATING THE HATCHING OF SILK-WORM EGGS.—Duclaux, after a careful observation of the external conditions which favor and influence the hatching of the eggs of silk-worms, has prepared the following rules, by attention to which it is said that the development of the eggs can be regulated at will. First, to prevent an egg from being hatched at the usual time, it must be kept, from the period of being laid, at a temperature between 59° and 68° F., and then exposed fourteen days to cold, three months before the time at which the hatching is desired, being subsequently treated in the usual manner. To cause an egg to hatch before the usual time, it must be exposed to cold twenty days after being laid, and kept in that condition for two months, and then removed. Six weeks later it will be in the same condition as ordinary eggs, and can be treated in the same manner. In this way it is possible to have silk-worms ready for hatching at any season of the year.

MILK-SUGAR FOR VEGETABLE JUICES.—According to Dr. Bouchardat, a specimen of sugar obtained from the *Achra sapota* of the West Indies, on being treated with boiling alcohol at 90 per cent., was found to leave a residuum, which, on further investigation, proved to consist almost entirely of milk-sugar, this substance forming 45 per cent. of the original mass.

RELATION OF THE NITROGEN OF THE ATMOSPHERE TO VEGETATION.—Deherain has been conducting certain experiments upon the influence of the nitrogen of the atmosphere on vegetation, and arrives at these conclusions: First, that in the course of the slow combustion of organic matter, the nitrogen of the atmosphere enters into combination, probably to form nitric acid, which, in contact with an excess of carbonized matter, is reduced and then gives up nitrogen to the organic matter; second, that every plant which throws off refuse matter upon the soil which sustains it, furnishes the occasion of a greater or less fixation of nitrogen. This reaction, continued for many years, ultimately produces the accumulation, in soils left to themselves, of a quantity of nitrogen sufficient to maintain a large crop of cereals; third, it is not only by the slight percentage of nitrogen which it contains that dung exercises an action upon vegetation, but, in addition, by the carbon matter in decomposition, which constitutes its entire mass. Buried under the soil, and exposed by the process of cultivation to the influence of the air, this organic matter becomes burned, giving rise to notable quantities of carbonic acid, and its combustion determines the union of elements of the air, with the nitrogen of the dung, and with the nitrogen which, previously floating in the atmosphere, is henceforth drawn into the series of metamorphoses which lead from the soil to the plant and from the plant to the animal.

PREPARATION OF BEET LEAVES FOR FODDER.—Méhay maintains the

entire success of his method of so preparing the leaves of the beet as to render them capable of preservation for several months as fodder; and at the same time greatly improving their qualities as food for cattle. The method consists simply in placing them in baskets, and immersing them in a tank containing diluted hydrochloric acid of 4 degrees of Beaumé. The result of this is to greatly condense the volume of the leaves, and to render it necessary to add more fresh ones to fill up the basket, which has to be again immersed, and finally allowed to drain off. The leaves may then be placed in beds, in dry earth, and kept until needed for use. According to a report of a committee who examined the results of this process, domestic animals become extremely fond of the leaves thus prepared; and, indeed, milch cows fed with them are said to give a large increase of milk, with a decided improvement in the quality of the butter. The tendency to diarrhea in cattle produced by the fresh beet leaves seems not to be developed by this prepared fodder, and for this and many other reasons it is strongly recommended to agriculturists.

Milk of diseased cattle.—Mr. Husson, in a paper upon the milk of animals diseased with the cattle plague, announces, as the result of one of his researches, that neither the flesh nor the milk of animals suffering from this cattle plague—contagious typhus—will convey the disease, although they may suffer greatly in their nutritive properties. The milk of diseased cows he found to have a more or less marked reddish-yellow tinge, and a disagreeable flavor, although cats fed upon it seemed to suffer no inconvenience.

As general conclusions, Mr. Husson remarks: First, that when the typhus breaks out in a cow-house, all the beasts therein are subjected, although in different degrees, to the epidemic influence. In fact, in one instance, the whole herd died, with the exception of four cows, which never seemed to be ill, although they furnished one of the three specimens of milk analyzed. Second, milk cannot, any more than flesh, transmit the disease to man, nor to animals that do not belong to the ruminant family. Third, notwithstanding this, even during the first stage of the disease, when the yield still continues normal, the milk should not be employed as food for young children, in consequence of the modification that has taken place in its principles. Fourth, from the commencement of the disease, the combustible elements of the milk, in great part, disappear, while the azotised elements, on the contrary, are increased in considerable proportions, and are soon found commingled with sanguinolent matters. Frequently there may be observed, under the microscope, agglutinated globules, either mucous or purulent.

New variety of cucumber.—In "Land and Water" we have a figure and description of what is called the new white-spine cucumber. This, when raised on a trellis, grows to an enormous size, one vine having three specimens, each of them three feet in length, besides many others over two feet long. The flesh is said to be very solid, with but few seeds, and the flavor very fine. This method of growing cucumbers is recommended as furnishing a much superior result to that of allowing them to trail on the ground, as they thus grow finer, straighter, and with a larger yield. This new cucumber has the skin perfectly smooth. It is very short in the neck, and it is considered a decided gain to the resources of the vegetable gardener.

Origin of breeds of British cattle.—In a communication to the Literary and Philosophical Society of Manchester, by Mr. William Boyd Dawkins, on the "Origin of our domestic breeds of cattle," he re-

marks that at the present time there are three well-marked forms inhabiting Great Britain. These consist of the hornless cattle, which have lost the horns which their ancestors possessed through the selection of the breeder. The polled Galloway cattle, for instance, are the result of the care taken by the grandfather of the present Earl of Selkirk, in only breeding from bulls with the shortest horns. The hornless is altogether an artificial form, and may be developed in any breed. Second, the *Bos longifrons*, or the small black or brown Welsh and Scotch cattle, which are remarkable for their short horns and the delicacy of their build. Third, the red and white variegated cattle descended from the *urus*, and which have, on the whole, far larger horns. The large domestic cattle of the *urus* type are represented in their ancient purity by the Chillingham wild oxen, (as generally called,) which were probably introduced by the English invaders of Roman Britain, being unknown to that country during the Roman occupation. The *Bos longifrons*, (long-horns,) on the other hand, were the sole oxen which were domesticated in Great Britain during the Roman occupation, and, in remote times, were kept in herds by the users of bronze, and before that by the users of polished stone. The present distribution of the two breeds agrees almost exactly with the areas occupied by the Celtic population and the German or Teutonic invaders. Both the *Bos longifrons* and the *urus* were probably derived from some country to the south and east of Europe, and were introduced by the herdsmen and farmers of the polished-stone period, at a very remote antiquity.

Brandy from sawdust.—The fact has long since been known that if cellulose is boiled with dilute acids grape-sugar is produced, and a similar treatment of lichens, according to a process devised by Professor Stenberg, is the initial step to the preparation of a very fair brandy. We now learn that quite a good brandy can be made from sawdust, generally from a mixture of the sawdust of pine and of fir timber. For this purpose 9 parts of very moist sawdust, .7 of a part of hydrochloric acid, and 33.7 parts of water, making 43.4 parts in all, are to be boiled together, under steam pressure, for eight hours and a half, after which the mass is found to contain 3.33 parts of grape-sugar; and after eleven hours 4.38 parts, in all over 10 per cent. of the entire mass. The acid is now to be neutralized with lime, so that the mash, cooled and ready for fermentation, is to contain one-half a degree of acid, (according to the acetometer,) and a suitable amount of yeast is to be added. After ninety-six hours of fermentation the mash is distilled, and sixty-one quarts of brandy of 50 per cent. of strength will be obtained, perfectly free from any smell of turpentine, and of extreme excellence of flavor. The experiment has not been conducted in a practical way on a sufficiently large scale to determine positively the merits of this process, but it is not at all unlikely that the success may equal that with the lichens, and that a large industry in this direction may be developed. It is not improbable, too, that experiments will show that other kinds of wood than those mentioned may be found better adapted to the purpose in question.

Influence of heat on plants.—Hugo de Vries, in a paper upon the influence of heat upon plants, discusses, in the first place, the upward limit of temperature for vegetable life, and finds occasion to agree with Sachs, who gives this limit at 120° to 150°, Fahr., for the air, and 112° to 117° for the water, although some latitude must be allowed for the age and precise character of the plant. In cases of thermal springs which contain living algæ, this limit must, of course, be largely extended,

as the result of special adaptation. In reference to the effect of rapid changes of temperature, the author finds that such alternations, however great and rapid they may be, do not exercise any injurious effect upon the vitality of plants as long as they remain below the maximum allowable and above the freezing point; but that such changes do exercise a direct effect upon the movement of the protoplasm, by causing its cessation, even in cases where the heating or cooling slowly, to the same degree, would not produce a similar effect. Inquiries into the influence of temperature upon the rapidity of germination confirm the results already obtained by Mr. Sachs—that for each species there is a most favorable degree of temperature for growth, since growth takes place at that point more rapidly than at any other temperature; and that below this point the length of a growing radicle increases in proportion as the temperature is elevated, while above that it is diminished more and more as the temperature ascends.

INOCULATION FOR RINDERPEST.—In an article upon inoculation for rinderpest, detailing the result of several experiments instituted in Russia on this subject, the following conclusions are arrived at: 1. Rinderpest must be considered as a typhus of a peculiar character, which, while having some resemblance to the epidemical typhus in man, differs from it in its permanent course, and the persistent occurrence of a catarrhal condition in general, and a mucous coating of the intestines in particular. 2. The rinderpest is disseminated principally from the steppes of Asia and other provinces of Russia. The region, however, where it first arose and the causes of its origin are unknown. 3. The contagion of rinderpest is transmitted, in part, by direct contact with diseased animals, and partly by the emanations from living and dead animals, affected, although not to any great distance at any one time. 4. In the south of Russia rinderpest is, comparatively, less contagious and dangerous than in other portions of the empire. 5. In summer and winter the rinderpest is generally less violent than in spring and autumn. Autumn is the most unfavorable time for inoculation of rinderpest, the most favorable time being that in which a moderate temperature predominates. 6. All races of cattle are not equally sensitive to contagion of rinderpest. Those less liable are the Kirgus and Kalmuck races, belonging to the steppes. 7. The alleged mitigation and weakening of the virus by repeated inoculation, and in the succeeding generations, does not prove to be substantially true, according to the experiments of Robichew, as even in the fifteenth generation it did not seem to have lost its activity. Professor Jessen considers, however, that the question of the weakening of the virus cannot be regarded as closed until a special series of experiments has been instituted, in which the contagion has been inoculated from the first generation, on gradually, to complete inactivity. 8. It has not been determined, positively, by the experiments how long the pest contagion maintains its aggressive activity. In many cases the virus loses its infecting power after the course of a few days; in others it remains many months. It must, nevertheless, not be overlooked that the aggressive power of the contagion may be dependent upon its preservation or other influences. Single cases of inactivity of the virus may be explained under the supposition that this has lost its activity in consequence of the milder nature of the epizootic, or the animals inoculated with the virus did not become ill, or only in a slight degree, on account of their want of sensitiveness to the contagion, or because they had already experienced the natural disease. In regard to the action of fresh and old virus, experiments have shown that the former generally produces more, and the

latter less violent sickness, and, in many cases, the latter is even inactive. 10. Animals which become violently ill under inoculation, and show the characteristic indications of rinderpest, are not sensitive to further infection. Such animals, however, as are but slightly ill after infection are not always spared when exposed to a repeated attack. 11. It is impossible to say how many years such animals as have survived the inoculation of rinderpest remain protected against a new infection; possibly during their whole lives. An immunity has been shown for a period of at least six years, this being the extent to which the inquiries of the committee have carried them. 12. The question whether inoculation has any influence upon the course of the rinderpest when the natural disease has attacked the same herd cannot now be definitely answered. 13. Dysentery is no protection against rinderpest, as animals attacked with this disease do not lose their susceptibility to the infection of rinderpest when exposed to its influence. 14. The discharges from the eyes and nose are the most efficient of all means of propagating the disease. The result of the inoculation was the same, whether applied on the neck, the ears, or the tail; whether it was communicated by drawing through a thread saturated with virus, or by inserting a strip of the skin cut from an animal which had died of the disease. The characteristic features of rinderpest present themselves generally between the fourth and eighth day after inoculation; and those animals in which the disease becomes fatal generally died on the sixth day after the outbreak.

Experiments with reference to the power of infection residing in the skin of diseased animals resulted as follows: *a.* Sound cattle can be affected by fresh or by imperfectly dried and cleaned skins of affected ones. *b.* The skins of diseased animals which have been simply cleaned by washing with lye and ashes or lime-water, or which have been dried at a considerable degree of heat or thoroughly dried in the open air, do not communicate the infection. The drying of the skins, however, should be conducted, if in the air, at a distance from stables or meadows, and in winter artificial heat must be employed.

In conclusion, the committee make the following remarks: Although the result of the experiments prosecuted to the present time upon inoculation do not entitle the committee to present inoculation as a preservative against the propagation of the rinderpest, they believe that land proprietors should be authorized to establish inoculating institutions at their own expense, the application to be made with the consent of neighboring owners of the cattle; and that these establishments should be widely removed from the roads upon which cattle are transported, and that they should be presided over by thoroughly educated veterinary surgeons.

VARIATIONS OF FLOWERING SEASONS.—Fritsch has lately published the result of an investigation into the variations of the seasons of flowering of plants in different countries, in the same year, and in different years; and basing his conclusions upon fifty-two plants and twenty-three stations, he remarks that the variations of the seasons of flowering are greater, as this time naturally falls in the earlier part of the year. Thus, of plants flowering in March, the variation will amount to thirty-seven days; while of those flowering in June, it amounts only to twenty-four days. These variations, again, are on an average as great in positive seasons as in negative; that is to say, the acceleration of the flowering season, on an average, of each plant investigated, is as great as the retardation; and it is only necessary to divide the entire varia-

tion by two in order to obtain the deviation, whether positive or negative.

USE OF SEWER-WATER AS A MANURE.—According to the *Revue Horticole*, experiments with the sewer-water of Paris, in the cultivation of certain lands below the level of the city, commenced three years ago, have been of the most satisfactory character, and the eagerness that the farmers now exhibit to obtain permission to use these waters on their lands, wherever it is practicable, is justified by the great increase in their value, many of them having previously been of little worth. Thus certain lands now rent for six and seven times as much per annum as formerly.

PREVENTION AND CURE OF TYPHUS IN CATTLE.—Dr. Déclat has published a report of certain experiments instituted by him for the prevention and cure of typhus in horned cattle, taking the occasion of a severe outbreak of the disease in France, in the early part of February, 1871. In the first stable he visited he found eight animals, of which number, one was dying with the fever; a second was badly attacked; and a third had fallen and could not get up; all the others being more or less under the influence of the disease. They had all been officially condemned to destruction as incurable. He first proceeded to administer a draught, consisting of eighty grains of carbolic acid in five to six quarts of water, to which was added a hypodermic injection of one hundred and twenty-five grains of carbolic acid, with the addition of a new substance, the precise nature of which he does not disclose at present. Two other animals were treated by a veterinary surgeon who was in attendance upon the herd. Out of these seven animals three died and four were cured, while of another series similarly affected six were cured out of ten; and, in the opinion of Dr. Déclat, none of them could have survived without this treatment.

A similar treatment of animals not actually under the influence of the disease was followed with the happiest results. Of twenty-five, to which the above-mentioned application was made, not one contracted the disease; the doctor, therefore, thinks himself entitled to urge the prophylactic treatment as of the utmost importance in similar cases. As the result of his researches in this direction, he contends that, by means of his method generally applied, typhus may always be prevented; can almost always be cured while in a state of incubation; is very often cured in its first period, and is sometimes cured at a more advanced stage.

KEEPING GRAIN IN VACUO.—Some time ago Dr. Louvel suggested the idea of keeping grain in a partial vacuum, by introducing it into air-tight vessels and exhausting the air, this being intended to prevent injury from dampness, and to secure it from the attacks of insects as well as vermin. We now learn that this idea has been brought to a practical test, and that it bids fair to enter largely into the operations of grain-dealers. For the purpose in question, vessels are made of boiler-iron, to contain about twenty-seven bushels; and after the grain is introduced and the cover applied, a vacuum is effected, which, for this purpose, need not involve a reduction of pressure of over one-sixth to one-seventh of the ordinary atmosphere. Any number of these receptacles can, of course, be made, and can be used over and over again indefinitely.

FACTS FROM VARIOUS SOURCES.

CINCHONA.—Since the publication of our February number, containing an article on this subject, (pp. 73, 74,) the Department has received several letters from California in relation to the same subject.

The first is from Arthur B. Stout, M. D., of San Francisco, with a copy of a proposed act "to create and establish a State botanical and zoölogical farm for the experimental culture of all desirable plants of foreign or indigenous growth, available for economic purposes, for the cultivation of knowledge in zoölogy, and for the foundation of a public thermal sanitarium for the cure of chronic maladies." The plan suggested, and to be carried out by legislation, is to appropriate one million acres of public lands, (granted by the State or by Congress,) forty thousand acres to be divided into four nearly equal and appropriately located farms, so as to obtain all the benefits of different climates, soils, altitudes, and of thermal springs—all to be under one general government, and each to be managed with reference to the object of its institution.

As the California legislature meets only biennially, the corperators desire, to avoid delay, that permission to occupy at least a portion of the lands be obtained from Congress, so that cinchona plants may be procured and set out immediately.

F. A. C. Grebner, of San Francisco, writes that he assisted at introducing cinchona plants into Java, under Dr. Jünghühn, and in their cultivation under the present Superintendent Van Gookum. He also planted over 200,000 cinchona trees in his own coffee plantation, and when they were six years old their bark was sold in Frankfort, Germany, at the price of bark from Peru. Though acquainted with the British plantations at Ceylon and Nighlberry, he confines his remarks to those of Holland, in Java, as the bark is superior to that of British India, and fully equal to that of Peru as regards the quality of the quinine extracted, though the alkaloid is generally less than in the Peruvian.

He says that the shipments of bark from Peru and Bolivia are annually decreasing. The plantations in Java now contain over four millions of trees of the best kind, and in the course of the next year a factory will be erected there to extract the quinine and prepare it for use.

Mr. G. thinks the climate of Southern California well adapted to the raising of cinchona and coffee, and that Chinese labor there will not be dearer, considering its greater efficiency, than Malay labor in Java. He says that entire freedom from frost can only be secured south of Los Angelos, along the coast of San Diego, extending back into the country some thirty or forty miles; that in this district the average temperature for years has been about 62°; the lowest, 51°, in January; the highest, 73°, in August; the rain-fall is 10 inches annually, but there are frequent heavy fogs. Wood-land is scarce, but that is no objection.

Mr. Grebner believes that capitalists cannot be interested in the subject until one or two successful experiments have been made, and proposes to commence on a small scale, at the same time trying coffee planting, and increase the planting as results may warrant. That success may be attained in growing the cinchona, there is little doubt; but as the coffee-plant requires a temperature uniformly above 55°, there is less prospect of success in its culture.

NATIONAL AGRICULTURAL ASSOCIATION.—The next meeting of the National Agricultural Association will be held in St. Louis, Missouri, on

the fourth Monday in May, proximo. In a circular issued by the President, F. Julius Le Moyne, esq., the importance of the meeting is set forth, and every agricultural organization throughout the country urged to send representatives.

ANGORA GOAT-BREEDERS' CONVENTION.—The goat-breeders of California met in convention, in the city of Sacramento, on the 28th day of February last. A permanent organization was effected, and rules and regulations for the government of the association adopted. The following-named gentlemen were elected officers for the current year: Thomas Butterfield, president; Nathan Gilmore, secretary; and L. A. Upson, treasurer.

A committee, previously appointed, made a report on the condition, &c., of the Angora, or Cashmere, goat on the Pacific coast, from which we make the following condensed statement:

First. The experiment of importing and acclimating them has been crowned with success. They have proved both healthy and prolific. The offspring of the pure blood goats are improving in size, and bear heavier fleeces than the imported, fully retaining their rich, silky, and glossy character. The fleece will range in weight from three to three and one-half pounds each from one-third to pure-blood, where they are in large bands; where they range in small bands, and are properly sheltered and cared for, they will average four to five pounds each. The number of pure-blood imported goats, including their offspring, will approximate two hundred and forty, about one hundred of which are owned by one party in Monterey County, about fifty in the hands of another party in El Dorado County, while the remainder are scattered throughout the coast.

Second. The crossing of the Angora with the native goat (breeding the Angora buck to the common female goat) has also proved successful. The progeny is healthy and increased in size over both native and pure-blood stock. The fourth cross produces as heavy a fleece, and of as good quality, as the imported, while the flesh of the grades makes excellent mutton, which commands a ready sale. They are found to be far more healthy than Sheep, being free from scab and other cutaneous diseases, and with none of the rank, musky smell so offensive in the common goat.

Third. It is found that the arid plains, bushy foot-hills, and rough mountains of the Pacific coast are well adapted to their growth, as they are now flourishing from Oregon on the north to San Diego on the south. The total number of these goats on the Pacific coast is estimated at forty thousand.

Fourth. A large majority of those who first engaged in raising Angora goats were induced, from various reasons, but principally from the scarcity of pure-blood and high-grade animals, to use very low-grade bucks, a great proportion of them being less than seven-eighths. No fleece has resulted from such crossing; neither is it possible to attain that end so long as such bucks are used. This much, however, has been attained: A large number of grades have been, by this system of breeding, worked up to a point that by now crossing with the pure-blood bucks a flock of valuable wool-bearing goats will be the immediate result. In crossing, the fleece all comes from the buck, consequently the blood of the buck should be pure.

Fifth. There is no market or machinery for the manufacture of the fleece in California, and the principal market is found in Philadelphia. Here the fleece brings 40 cents per pound for the lowest grades, ran-

ning up to 80 cents, $1.10, and $1.20 in gold, as per quality. There is a considerable quantity of wool (mohair) in the hands of breeders, yet it is not in sufficient quantities to induce the parties holding it to take the trouble to ship it to the East.

Sixth. The skins of low-grade wethers, disposed of for mutton, are now dressed—the inferior ones into leather for the manufacture of boots, shoes, and gloves, while the better ones have been dressed with the fleece on, and used extensively and profitably in the manufacture of robes, ladies' furs, &c.

AGRICULTURAL ASSOCIATIONS.—Mr. F. H. Gordon, president of the Smith County (Tennessee) Agricultural Club, in the course of a recent letter, makes the following observations touching the great importance of agricultural associations:

Our club unanimously approves the efforts of your Department to enlighten our farmers. And here permit me to say that if the Department of Agriculture can induce farmers everywhere to form small clubs of eight or ten members, and bind them permanently together by motives of self and social interest, so as to induce them to attend all their meetings regularly, and to devote much time to the study of agriculture at home, then our whole industrial population will educate themselves in their professions, and make rapid improvement in the means of living and the prosperity of the country. There can be no general education which is not self-education. A State cannot educate the people. They can and must educate themselves. The State can stimulate, foster, and facilitate self-education. To do this, the Government must reach every citizen at home, individually. If your Department can induce the farmers to form small neighborhood clubs everywhere, then you can reach every one through his club. What our National Legislature and your Department ought to do, in order to accomplish this desired object, must be left to the best minds of the nation. It is evident that farmers will not readily and generally send their sons to our agricultural colleges until they themselves have been partly educated. They must first appreciate the value of science before they will send their sons to college. Hence, the work of reform must commence on the farm and at the fireside. But to accomplish this object your Department must organize small neighborhood clubs everywhere, and send them the science of water, air, soil, and the animal and vegetable kingdoms. These documents will be their text-books at home. Thus the National Legislature will enable your Department to educate all farmers at the fireside and on the farm; and thus the United States present to the world the first educated community. But you cannot get the people generally to form small clubs, unless you offer them some strong inducements. You must teach them that the Government will furnish them with books, documents, and other favors, only upon the condition that they shall use them. They should be required to form clubs before receiving any favors; and more; so long as such favors are continued they should report annually to your Department.

NECESSITIES OF SOUTHERN AGRICULTURE.—Mr. Harvey Hammond, of Augusta, South Carolina, under date March 2, 1872, writes as follows:

I return to you the acknowledgments and thanks of the Beech Island Farmers' Club for the seeds sent by the Department of Agriculture. They have reached us safely, and have been distributed. I trust in due time to report a good result from their trial. The members of the club would likewise signify to you their appreciation of your expressions of interest in southern agriculture. We feel more and more the need of information as the problems set before us by the emancipation of our laborers continue daily to widen. Trained to work, laborers employed by us for their own and their children's children's lifetime, we find ourselves constantly out of our depth as we try to fathom the many and profound changes required by a system that employs laborers by the day and by the job. For instance, we cannot understand how it is that, with a soil and climate producing crops that give a much larger money yield per acre than in the Northern and Western States, we are not able to pay one-fourth the wages to labor that are paid there. It may be that a laborer does more there than he does here, and we therefore feel a great interest in knowing the cost of the various sorts of farm work by the *piece* in the different sections, *e. g.*, daily wages being $1, what does it cost to break up, broadcast, an acre of ground, to plant an acre of wheat, to build 100 feet of fence, to lay off an acre of corn, to cut an acre of grass, &c., &c.

In meteorology, too, we would be benefited by some more general statements. As, for instance, a record for successive years of the last frost in spring, and the first frost in autumn; the *sums* of the temperature, of the rain-fall, &c., for each season, and dur-

ing the period of growth of our leading crops. The farmer has not the time or the capacity for making these generalizations, either from his own observations, (usually worthless,) from those of the Department of Agriculture, or of the signal service. At present the distinctive features of succeeding crop seasons pass by, and leave no record for our guidance.

As for seeds, we feel especially the need of grasses and other forage crops for winter and spring grazing and feeding. We also believe that our cotton-seeds might be greatly improved by a system of budding and hybridizing the varieties of this plant, where it could be scientifically conducted for a length of time, as it might be under glass; and we believe that the southern cotton-planter must rely more and more on the excellence of the staple he produces to overcome competition from other countries.

NORTHERN MAINE.—Mr. J. W. Lang, secretary of the Brooks Farmers' Club, says that Aroostook County contains much first-class farming land, and will receive a large immigration this spring. A colony has been planted there, of Swedes, by State authority and expense. State lands are actually given away to settlers, 50 cents per acre, paid in work upon roads to convenience the settler; and farms, with some improvements, can be procured cheap. Wheat, corn, oats, rye, potatoes, hay, and other products are largely produced. Stock-raising is a leading feature. Orcharding yet in embryo. Schools, mills, and social privileges abound.

The act to promote immigration and the settlement of the wilderness portion of this State, passed by the present legislature, probably provides for all the expenditures of money that will be necessary for the State to make in this direction. The Swedes are proving themselves industrious, economical, and enterprising. That they have a true conception of what is needed to develop the resources of their chosen homes is shown by the fact that they are to erect a steam-mill for the manufacture of lumber.

FARM PRODUCTS IN NEW YORK.—At a late meeting of the Le Roy Agricultural and Horticultural Society, Mr. H. Ives reported a successful potato culture upon 24 acres of average soil, clover turf of a year's standing, turned under and thoroughly tilled with the shovel-plow and cultivator. This thorough tillage prevents rot in the seed, and is cheaper than hand-culture. Such weeds as escape it are carefully exterminated by hand. The whole expense of production, including interest, was $972; the yield was 3,660 bushels, which, at 40 cents per bushel, $1,440; leaving a net profit of $468, or nearly $20 per acre—over 48 per cent. upon the cost. The most productive varieties of seed were the Harrison and Peerless.

The president, Mr. H. H. Olmsted, realized a profit of 30 per cent. upon a moderate yield, raising 2,400 bushels of Early Rose upon 10 acres; and 820 bushels of Harrisons upon 2½ acres. Mr. E. Hammond, of Bethany, found the Early Rose to blight extensively in the top in the second year. Mr. W. L. Bishop raised 200 bushels per acre, but lost about half by blight. Mr. J. Peck, of Stafford, found the Peach Blows better than the Early Rose.

Mr. C. K. Ward raised 8 acres of Diehl wheat, 44 bushels per acre. It was well manured with ten or twelve loads per acre. White Michigan on the same field yielded only 33 bushels per acre.

Mr. J. Peck, of Stafford, raised the pure Diehl wheat after barley, putting twenty loads of manure per acre. Yield, 30 bushels per acre, and quality excellent. Mr. W. L. Bishop raised 50 acres of wheat—25 each of Diehl and White Michigan—raising 1,400 bushels, or 28 bushels per acre, worth, at $1.60, $44.80, leaving a net profit of $26.60 per acre.

Mr. A. Hill, on 1⅝ acres, raised 77 bushels shelled corn; corn, fodder, and pumpkins brought $105.50; expenses, $49.50, leaving a profit of $56. Mr. R. Sweetland raised 150 bushels of Sanford ears per acre, but would not recommend it as a general crop.

Mr. J. E. Hazleton said that there are no orchards in this county too old to be productive. Many trees in New England two hundred years

old were still healthy and productive. The best time for pruning is after the middle of June. Several gentlemen denounced the injudicious pruning practice employed in many cases.

AGRICULTURAL PROGRESS IN DELAWARE.—Mr. William C. Lodge, secretary of the agricultural society at Claymont, Delaware, states the object of that association to be the diffusion of scientific knowledge, based upon actual experiment. The practical aims of the society embrace the most profitable crops that can be grown in the locality, and the securing of maximum results with a minimum outlay of labor and expense. Especial attention is given to the propagation of new and valuable varieties of fruit. Periodical exhibitions are not contemplated, but specimens of merit are presented at the weekly meetings.

PRAIRIE FARMING IN ILLINOIS.—A correspondent from Du Page County, Illinois, a resident since 1842, commenced farming operations in that year by breaking the "raw prairie" from 4 to 6 inches deep with the plow. He found that the more deeply plowed sod rotted much the sooner. Part of the first year's breaking, sown with oats, yielded about 40 bushels per acre. The remainder of the breaking was planted in seed-corn, dropping the seed in every fourth row, lapping the furrow over the corn. This part of the breaking yielded from 25 to 30 bushels per acre. The following year, the sod not yet having sufficiently rotted, the furrows were turned back again, harrowed three or four times, and sown with fall wheat. There being but little snow that winter, the wheat mostly froze out; it was "bali" wheat. Next season another fallow was sown in "blue-stem" wheat, yielding forty bushels per acre. The land was plowed in May, and again just before seeding time, which was during the full moon of September. The seed was sown broadcast on a six-pace land, at the rate of about 2 bushels per acre. The ground was cultivated with a broad shovel-plow, and then the grain was covered by a small triangular drag. In twenty-five years, farming on this system, our correspondent never failed to raise a good crop of fall wheat.

AGRICULTURAL STATISTICS OF BOONE COUNTY, ILLINOIS.—Mr. G. E. Moss, of Belvidere, Illinois, has compiled for the Department the following statistics for Boone County for twelve years, ending with 1871, giving an illustration of the local changes and increase of productions throughout the Western States.

Year.	HORSES.	HOGS.	SHEEP.	CATTLE.	MULES.	NUMBER ACRES IN CULTIVATION.		
	Number.	Number.	Number.	Number.	Number.	Wheat.	Corn.	Other field crops.
1871	6,010	10,604	14,487	15,231	96	15,654	22,950	25,847
1870	6,438	6,754	19,531	14,718	106	19,472	18,542	24,003
1869	6,465	5,679	24,008	14,882	98	21,911	17,335	21,995
1868	6,033	7,791	28,101	13,791	100	20,544	16,171	20,657
1867	5,685	8,971	25,086	11,500	85	18,351	15,716	23,923
1866	5,643	7,553	21,267	11,019	68	16,743	17,231	25,860
1865	5,531	4,881	17,703	12,535	43	18,514	16,430	26,796
1864	5,195	5,525	18,001	14,350	30	24,817	15,380	21,757
1863	5,043	6,490	13,523	14,371	42	31,849	15,670	18,894
1862	4,847	5,767	9,475	13,533	21	36,342	14,020	15,221
1861	4,760	3,844	5,808	12,617	15	38,109	14,363	16,196
1860	4,608	3,293	4,942	12,507	9	78,084	17,550	21,497
Totals	66,318	76,757	202,239	160,695	713	340,373	203,258	262,065
Means	5,526	6,396	16,853	13,391	59	28,364	16,946	21,839

AGRICULTURE IN COLORADO.—Mr. Thompson J. Hough, near Idaho Springs, Clear Creek County, Colorado, at an altitude of 8,400 feet, last season raised successfully the following crops, viz: Beans, (dwarf,) beets, cabbages, (early,) carrots, cresses, lettuce, onions, parsnips, peas, (all sorts,) radishes, turnips, potatoes, barley, oats, timothy. The following crops have been tested, but have entirely failed, viz: Pole-beans, corn, cucumbers, musk-melons, water-melons, squashes, and tomatoes. The blue-bird, this spring, was first seen March 18, nine days earlier than last year. Natural grasses are failing rapidly, from being trampled by stock, while their seed, when sown, grows so slowly as to be of little practical value. A strong growing perennial grass is the especial want of those regions.

FARMING IN TEXAS.—Dr. D. W. Brodnax, of Cameron, Milam County, Texas, writes:

Mr. John Gratham, of this neighborhood, with the assistance of an infirm boy seventeen years of age, cultivated and raised, in 1868, 22 acres of cotton, from which he gathered 27 bales averaging 514 pounds, equal to 25¾ bales averaging 500 pounds. On other land, with same labor, he made 1,000 bushels of corn. In 1869, on the same land, he made 20 bales of cotton, averaging 522 pounds per bale, and 800 bushels of corn. In 1870, on the same land and with the same labor, he raised 24 bales, averaging 518 pounds per bale, and 1,200 bushels of corn. His wife and two little daughters assisted in gathering and saving the crops. In addition, he raised potatoes, onions, and all the garden vegetables usually cultivated here, largely in excess of the wants of his family. He also raised a number of hogs, and had a considerable quantity of bacon to sell. He paid $3 per acre for his land. As good land now brings from $3 to $5 per acre.

MONTGOMERY COUNTY TEXAS.—Mr. Charles B. S. Stewart, secretary of the agricultural society of this county, reports that, since the emancipation of the slaves, the practice of saving corn-fodder in that county has been measurably abandoned, with excellent results in the increased weight of the corn and in increased attention to Hungarian grass, oats, millet, &c. It is found that the whole stalk of oats cut "before the milk formation" becomes very nutritious, and is entirely eaten up by cattle. It requires, however, twice as long to cure hay from the oats cut at this stage. The cotton area of this county, in 1872, will be increased 50 per cent. The crop of 1871 was crippled by a drought of five weeks. It was forwarded before the advance of prices, to the great loss of the producers. The merchants are looking sharply after the earliest reports of the crop.

DISPLACEMENT OF NATIVE GRASSES IN TEXAS.—In the prairies of Texas, especially on river and creek bottoms, the native grasses are rapidly disappearing, from the number of stock ranging upon them. But little effort has been made to supply the loss by cultivating other varieties. Cattle now require feeding. California clover grows here very copiously. Blue grass is growing well in Washington County, and Italian rye-grass in Montgomery. Other varieties are well spoken of.

WINTER WEATHER IN SOUTHEASTERN TEXAS.—Mr. J. E. Carlton, corresponding secretary of the Agricultural, Mechanical, and Blood-Stock Association of Jasper, Jasper County, gives the following record of the weather of that locality for each day of January and part of February, 1872: 1st, 2d, 3d, 4th, and 5th, frost; 6th and 7th, rain; 8th, 9th, 10th, freezing; 11th, 12th, 13th, frost; 14th, 15th, 16th, freezing; 17th, 18th, rain; 19th, 20th, freezing; 21st, 22d, snow; 23d, rain; 24th, 25th, rain; 26th, 27th, sleet; 28th, 29th, 30th, 31st, freezing. February 1st, 2d, 3d, 4th, frost; 5th, 6th, 7th, rain; 8th, 9th, 10th, cold wind; 11th, 12th, 13th, cold and blustering; 14th, 15th, 16th, fair. The coldest winter

known by the oldest inhabitant. This disposes of the pretense that shelter is unnecessary in that climate for farm animals.

San Bernardino.—A correspondent, under date of March 23, sends us some facts relative to the new settlement of "Riverside," San Bernardino County, California. This settlement is located in the upper part of the Santa Anna Valley, near Mount San Bernardino, fifty miles east of Anaheim Landing on the Pacific Ocean, and sixty miles southeast of Los Angeles, at an elevation of about 1,000 feet above the level of the sea. The settlement is about eighteen months old, and already embraces some sixty families of enterprising and industrious people. The lands on which they are located are from 60 to 100 feet above the Santa Anna River, which furnishes water by means of a ditch nine miles in length, for irrigating purposes. This ditch was not completed until July last, and nothing was raised but corn, beans, &c. Yellow flint-corn, planted August 1, and the white bean, planted the 23d day of the same month, ripened. A large area has been sown with wheat and barley. Barley sown early is now heading out, and early wheat is about ready to head. A second crop of corn and vegetables will be raised after the barley and wheat are harvested. Garden vegetables, including corn, beans, and squashes, are now several inches high. Strawberries, unprotected, are now ripening. Field corn is up and looking finely. The land is clay with a mixture of sandy loam; the climate is dry and warm; the air is pure, and is considered very healthy, being regarded as especially beneficial to those afflicted with lung diseases, many of whom made their home there during the past season. The climate and soil both appear favorable to the cultivation of the raisin-grape, orange, lemon, lime, and English walnut. A noticeable thing in the climate is the fact that when the mercury descends to 32° the frost seldom cuts down such tender vegetation as corn, beans, &c., only slightly, if at all, injuring them.

Mesquite-gum.—Mr. F. Kalteyer, treasurer of the Agricultural and Industrial Association of Western Texas, says the mesquite-gum of that region is almost identical with gum arabic, having been in use there for medicinal and technical purposes, especially in the preparation of mucilage, gum-drops, jujube-paste, &c. The past year it has become an article of export, some 12,000 pounds having been gathered in Bexar County, and as much more between that and the coast. No gum is gathered west of Bexar, though the drought was favorable to a large crop. This gum is hardly known east of the Brazos. It exudes from the stem and branches of a *Mimosa*, several species of which grow in Texas, New Mexico, and Arizona. One of these species, *Algarobia glandulosa*, (Torrey and Gray, N. A. F., 399,) is rarely met with below the mountain regions of Western Texas. The species most common in Bexar County grows from 20 to 40 feet high and 18 inches thick. From it charcoal is manufactured. It is generally used for picket poles, being very durable. It is also made into handsome furniture, the grain being very fine. It grows where no other fruit-tree would live. It was favorably noticed in the last annual report of the American Pharmaceutical Association.

Wire-fences in Texas.—Mr. R. E. Talbot, Georgetown, Williamson County, Texas, describes a new wire-fence which has been extensively introduced into that section, which, it is claimed, can be built for less than $1.25 per rod. It has been fully tested by wild Texas cattle, and is perfectly hog-proof. It consists of eight wires, No. 9 size, passing through cedar posts a rod apart. The lower four wires are 6 inches apart, and the others 9 inches. This will give a 5-foot fence. Between

the posts weave in three sawed or split pickets, which should not reach the ground. Staple the wires to the pickets.

OTOE COUNTY, NEBRASKA.—A correspondent writes us that the winter-wheat has been badly injured in this county, though the full extent is not known. Osage-orange hedges are thought to be almost entirely destroyed.

FRUIT PROSPECTS IN ILLINOIS.—Mr. J. Cochrane, of Havana, Mason County, Illinois, writes, under date of April 6, that about half the peach buds in that section are killed, those that are yet good being mostly seedlings. The prospect for apples, pears, and cherries could not be better.

WASHINGTON TERRITORY.—Mr. A. H. Miller, a resident for twenty years of Yakima County, Washington Territory, sends us some interesting facts concerning that Territory. He has never seen the snow exceed eight inches in depth, nor remain on the ground over two weeks in each year. The wind rarely blows a gale even in the winter season, and the cutting blasts of the prairie States are never felt. As a general thing stock can be well kept through the winter on uncut grass. Cows, dried in the fall, get into good order for beef by spring, and calves and yearlings steadily gain in size without any other feed than that obtained by grazing. The soil is measurably good—in some places remarkably productive. While one spot may possess a rich, black, loamy soil, the ground a few yards distant will be white with alkali. Corn, wheat, oats, barley, sorghum, broom-corn, millet, herd's-grass, melons, tomatoes, beans, potatoes, &c., yield good crops with fair culture. One farmer raised last year on sod land 40 bushels of sound corn to the acre and 73 bushels of goose-wheat or Russian rye. Another raised 60 bushels of white winter-wheat to the acre. It is no uncommon thing to cut from 80 to 90 bushels of oats to the acre. The cultivation of sorghum promises to be successful, as does that of the larger and smaller fruits.

ODESSA WHEAT.—Mr. L. H. Eaton, of Monroe, Green County, Wisconsin, has cultivated the Odessa wheat for five years, with good results. Twice during this time other varieties failed, but the Odessa produced 20 bushels to the acre. The berry is small, but weighs 63 pounds to the measured bushel. It is equal to winter-wheat for milling purposes. It is eight days later in ripening than other varieties.

WINTER-WHEAT.—Mr. John J. Thompson, of Thompson's ranch, Dakota Territory, writes under date of March 8 that he has 40 acres of growing Baldwin wheat which has stood the winter finely, and is now quite as green as it was the 1st of November last.

EFFECTS OF THE SEVERE WINTER.—Mr. R. E. Baldwin, writes as follows from Ottawa, Franklin County, Kansas, under date of March 30:

> The winter has been one of unparalleled severity. Twenty thousand cattle have perished in the Solomon Valley from starvation and the cold weather. Potatoes buried for spring use and for seed are mostly frozen, the ground freezing sometimes to the depth of three feet. Early-sown winter-wheat is almost an entire failure. That sown late in the fall and not germinating is now coming up, but must inevitably make a very light crop.

TRIAL OF AGRICULTURAL IMPLEMENTS.—The Ohio State board of agriculture have appointed a trial of agricultural implements and machines, to take place at Springfield, June 18, 1872. The following is a list of classes designated for competition, with the premium for the best of each description: Plow for general purposes, stubble-plow, sod-plow,

double plow; premium in each case, a silver medal or $20. Subsoil plow, hill-side plow, one-horse plow, double-shovel plow—a premium for each of a silver medal or $10. Steam-plow, practical utility of operation to be fully demonstrated, $50; improvements in plows, diploma. Two-horse grain-drill, $40 and diploma; one-horse grain-drill, $10 and diploma; garden seed-drill, $5; horse-power corn-planter, $20 and diploma; potato-planter, $5; potato-digger, $10; two-horse corn-cultivator, $20 and diploma; one-horse corn-cultivator, $10 and diploma; farm-road scraper, $10; roller and crusher, $15; harrow, $10; mole or blind ditching-machine, $20; post-hole borer or digger, $5. In giving premiums on plows, the following points will be considered: Gross draught; weight; loss of power in overcoming friction; net power required to cut and turn the furrow-slice; width of furrow-slice; depth of furrow-slice; comparative draught; simplicity of structure; materials; workmanship; durability; price; superiority of work. Competition is invited from all parts of the Union.

PREMIUM CORN CROPS IN VIRGINIA.—The following particulars are from statements on corn by competitors for premiums at the Rockbridge County Fair, Virginia: Farm of J. D. H. Ross, clay loam, upland; an old timothy and white clover sod, plowed in December with three horses, harrowed four times with three horses; hills marked 3 feet by 3½ feet apart, and manured with home-made compost, a handful to three or four hills; plowed three times in the course of the season; one acre yielded 76 9/10 bushels of shelled corn, 56 pounds to the bushel, and five acres gave 253¾ bushels. Farm of A. L. Nelson, loam, with clay subsoil; in grass for four years; plowed in February to a depth of 12 or 14 inches, and harrowed well just before planting, April 26 and 27; the hills received plaster and ashes at the rate of two-thirds of a bushel of plaster and one and one-third bushels of ashes per acre; one acre yielded by measure 91½ bushels; by weight, 86 bushels 37 pounds each; five acres yielded 317 bushels by weight. Farm of G. W. Pettigrew, on a sandy loam, having a northeastern exposure, and overlaid by one to three inches of soil deposited by the flood of 1870; plowed in April to the depth of ten inches, planted April 12; one acre yielded 89¼ bushels by measure, or 97 bushels 47 pounds by weight, and five acres gave 400 bushels and 40 pounds by weight.

EXPERIMENTAL FARM FOR MISSISSIPPI.—Governor R. C. Powers, of Mississippi, in a message recently communicated to the legislature of that State, recommends that the grounds lying between the State capitol building and Pearl River be erected into a public park and experimental farm for agriculture, under the auspices of the Planters, Manufacturers, and Mechanics' Association of that State. But a small appropriation is asked, which the governor thinks should be expended under the direction of the State engineer and professor of agriculture of Oxford University.

HEAVY YIELD OF CORN.—J. Sanders, of Saunders County, Nebraska, deposes that he raised 18 acres of corn last year, which averaged 90 bushels to the acre. J. H. Nesbitt, of the same county, also deposes that 75 acres of corn raised by him averaged 97 bushels per acre, while another field of 175 acres averaged 85 bushels per acre.

PROPER MODE OF TESTING SEEDS.—Mr. Elliott H. Benton, of Le Roy, Dodge County, Wisconsin, in a letter commending the policy of this Department as to the distribution of seeds, says:

To get a practical result in the least time, seed sufficient for at least one-half acre

should be furnished, so that ordinary field-culture in every respect should be observed in testing its value; and this can be done satisfactorily *only* by a perfectly similar treatment of some common sort under perfectly similar conditions, side by side, such as, first, amount of seed per acre; second, quality and situation of land; third, manner and time of sowing; fourth, depth and manner of cultivation; fifth, former treatment of land, &c. The testing of any field-crop requires very faithful management and patient waiting, for not less than three years will be essential to acclimate and give an average of seasons. The most valuable result would be reached by a maximum yield from the use of a minimum amount of fertilizers and labor. There is no practical value attaching to the use of an unlimited amount of manure and labor, simply to get the largest percentage of yield, for the crop may cost more than it is worth. But the first point should be to ascertain the best manner of sowing; secondly, to ascertain the proper amount of seed per acre; thirdly, to ascertain the best method of cultivation for a certain variety of grain and a certain character of soil; and, fourthly, to apply the manure in the manner to get the best effect.

EXPERIMENTS WITH SEEDS.—The committee appointed at the convention held in Chicago, on the 24th and 25th days of August last, to report a plan of experiments to be tried in common at the different agricultural colleges of the country, submit the following:

Experiment No. 1, *to test the variation of soils on adjacent plats.*—We recommend that 20 plats of one-twentieth of an acre each, 2 by 4 rods, with strips of 4 feet between each, be selected on a soil as uniform as possible, which has not been manured, at least for a number of years. It should be well drained, (tile-trained is best.) The aspect of the whole should be the same, and the slope, if any, as uniform as possible. Where not uniform the facts should be noted. They should be plowed and otherwise cultivated uniformly at the same time even in the day, and under the same conditions as nearly as possible. These plats should be planted to corn in drills at a uniform distance between rows, one kernel in a place, at uniform distances in the rows, so that each plat shall contain the same number of stalks. Good cultivation should be given, but no manure applied, and the experiment should be repeated in 1873 and 1874. The stalks and ears on each plat should be counted. The corn should be cut up at a proper stage of ripeness, weighed green, each plat separately, and cured in the same stooks; and when thoroughly dried should be weighed again, stalks and all. The ears should then be husked and weighed separately, both when first husked and again when the cobs seem thoroughly dried. The pounds each of soft and sound corn should be noted. The dates and amount of time occupied in going through each process of planting, culture, harvesting, &c., should be accurately noted and performed in the dry part of the same day. This experiment is intended to ascertain the differences in the natural productiveness of adjacent or nearly adjacent plats, with the view of getting the exact conditions before applying manures. The corn used should be the variety most successful in the neighborhood, and the strips between plats should be kept cultivated.

Experiment No. 2, *to test the uniform application of manure on alternate plats.*—As an immediate experiment, under somewhat uncertain conditions, we recommend this: The same care in securing uniform soil, aspect, slope, &c., should be had. We recommend, as in the other case, 20 plats, each 2 by 4 rods, but separated each from the other by strips of 4 feet each, in order that the influence of the manure on manured plats may not be felt on unmanured plats. These strips should be kept clean and the surface stirred. The same weight of manure, of uniform quality, should be applied to alternate plats, leaving the other half unmanured. The plats should be planted with corn, and be cultivated and harvested as prescribed in experiment No. 1.

Experiment No. 3, *to test the comparative productiveness in hills and drills.*—Two acres, as nearly uniform and identical in soil, aspect, and slope as possible, should be planted, after staking off the ground, as in experiment No. 1, one in hills, the other in drills, the rows being the same distance apart, and the number of stalks to the square rod the same. The different fields should receive the same amount of cultivation, the crops be harvested and weighed, and the sound and soft corn compared as in experiment No. 1.

Experiment No. 4, *to test the comparative effect of common and continuous cultivation.*—We recommend that another acre be taken, 10 by 16 rods, and divided into one-twentieth of an acre plots, and planted with corn in drills, as in experiment No. 1, making the rows run the long way of the acre, four rows to the rod, or forty rows, each 10 rods long. Commencing on one side, give the first four rows common culture; the next four continuous stirring of the surface during the whole time of cultivation, and so on, alternating through each acre, giving five strips common and five strips continuous cultivation. In harvesting, we take account only of the two middle rows of each strip or tier of plats. These should be cut up, weighed, dried, husked, &c., as in experiment No. 1.

LUMBER PRODUCT OF THE UPPER MISSISSIPPI.—Local estimates assign the following aggregates to the last "log crop" of the Saint Croix River and its affluents, viz: Willow River, 9,000,000 feet; Apple River, 25,000,000; Wood River, 3,000,000; Clam River, 5,000,000; Yellow River, 9,000,000; Nimekagon River, 25,000,000; Chipenazey River, 7,000,000; Totogatic River, 6,000,000; Frog Creek, 5,000,000; Beau Creek, 2,100,000; Moose River, 4,000,000; Main Saint Croix River, 6,000,000; Snake River, 70,000,000; Kettle River, 30,000,000—total, 206,000,000. The Mississippi and its affluents, above the Falls of Saint Anthony, yielded about 200,000,000 feet, making 412,100,000 feet produced by the Upper Mississippi and its affluents during the winter of 1871–'72.

SWISS SCHOOL OF MILK PRODUCTION AND MANAGEMENT.—The Swiss Mountain Union, which has for many years been interested in the milk business, has issued a circular in which it claims that milk production and the care of the mountain pastures are the inseparable factors of the nation's wealth. The only article of export is cheese, which was exported in 1868 to the value of 18,674,832 francs, and in 1869, 21,453,796 francs. The increase of milk products in other parts of the world is alluded to. American factory cheese, an imitation of the English Cheshire, is rivaling its prototype in its home market. Sweden and Denmark have established extensive dairies, while Holland, which controls the cheese trade of the world, has established at Utrecht a perpetual exhibition of dairy utensils, &c., for the instruction of dairymen. The Austrian minister of agriculture has given two annual prizes for the benefit of cheese-factory associations, while in Vorarlburg, Tyrol, Bavaria, Italy, and Prussia, the latest facts, principles, and improvements are disseminated by means of itinerant lecturers, fairs, exhibitions, and publications. It is proposed in Switzerland to adopt this policy in the organization of a school of theoretical and practical instruction in milk production and management. For this purpose funds are to be raised from the cantons, agricultural societies, and individuals. Great results are anticipated from this enterprise.

COTTON-SEED AS A FERTILIZER.—Mr. G. G. Zenor, a planter near Pattersonville, Louisiana, last year made 65 hogsheads of sugar from 35 acres of old prairie land. From 12 acres, fertilized with cotton-seed at the rate of $15 per acre, he obtained 35 hogsheads, or nearly 3 hogsheads per acre. The remaining 23 acres produced 30 hogsheads, or less than 1¼ hogsheads per acre. This surplus product of 1¾ hogsheads, about 2,000 pounds per acre, involved an additional cost for fertilizers of about three-quarters of a cent per pound.

CALIFORNIA WOOL PRODUCT.—From Miller & Co.'s annual wool report, dated San Francisco, California, March 11, 1872, we have the following facts relative to the wool product of that State for the year just closed: Spring clip, estimated receipts at San Francisco and other points, 13,389,187 pounds; fall clip, 9,896,941 pounds; pulled wool received, 990.125 pounds, making a total of the product of California for the year 1871 of 24,276,253 pounds. The total product for 1870 was 19,460,565 pounds; increase, 4,815,688. There were also received at San Francisco from Humboldt, Oregon, Washington Territory, and British Columbia, 1,187,160 pounds; from Sandwich Islands and Australia, 1,016,463 pounds, and from Mexico 1,090 pounds. Total amount received from other sources, 2,204,713 pounds.

"LOST NATION WHEAT."—Mr. J. W. Lang, of Brooks, Maine, writes

that this wheat is taking the lead in his State. Notwithstanding the drought and grasshopper plague, seventy-three bushels of handsome wheat were produced last year on three acres of plowed land upon an old farm in Waldo County. On another, where the grasshoppers were in great numbers, reducing the hay crop three-fourths, sixty-four bushels were produced on four acres. No other grain was harvested on the same farm out of several acres sown. This wheat makes a fine grade of flour, and holds its reputation in all parts of the State. Commands $3 per bushel for seed.

ENCOURAGEMENT TO TREE-PLANTING IN MAINE.—The following act was passed by the recent legislature, and has become a law:

That any land-holder in this State who shall plant or set apart any cleared lands, or lands from which the primitive forest shall have been removed, for the growth and production of forest-trees, within ten years after the passage of this act, and shall successfully grow and cultivate the same for three years, the trees being not less in number than two thousand on each acre, and well distributed over the same, then on application of the owner or occupant of such lands to the assessors of the town in which the same is situated, and is so successfully cultivated or set apart to forest-trees, and at the time of such application shall file with said assessors a correct plat of such lands, with description of their location, and setting forth all the facts in relation to the growth and cultivation of said grove of trees, or incipient forest, the same shall be exempt from taxation for twenty years thereafter; provided such grove or plantation of trees shall during that period be kept alive and in a thriving condition.

WHEAT AND POTATOES IN WESTERN NEW YORK.—At a recent meeting of the Le Roy Agricultural Society, Genesee County, New York, C. K. Ward reported a crop of 352 bushels of Diehl wheat, grown on 8 acres, which had been dressed with about eleven loads of manure per acre. This yield, averaging 44 bushels per acre, was the largest he had ever obtained. W. L. Bishop reported 1,400 bushels of Diehl and white Michigan wheat on 50 acres, averaging 28 bushels per acre, worth $1.60 per bushel. Expenses per acre (on summer fallow) $18.20, leaving a profit of $26.60 per acre. H. Ives, of Batavia, reported 3,600 bushels of potatoes, Early Rose, Goodrich, Harrison, and Jackson, on 24 acres, averaging 150 bushels per acre. Total value of the crop, at 40 cents per bushel, $1,440; expenses, including $16 for manure on one acre, taxes, and 7 per cent. on land, valued at $180 per acre, amounted to $972, or $40.50 per acre; total profit, $468; profit per acre, $19.50. Mr. Ives has had long experience in this crop, and this statement represents his average product and profit for a course of years. He plants on a clover sod of one year, and does all the tilling with shovel-plow and cultivator, running them once a week till time of wheat harvest. H. H. Olmsted, president of the society, reported 2,400 bushels of Early Rose potatoes on 10 acres, averaging 240 bushels per acre, and 820 bushels of Harrison on 2½ acres, averaging 328 bushels per acre.

FLAX CULTURE IN IRELAND.—The acreage of flax culture in Ireland, for the year 1871, in the provinces of Ulster, Connaught, Leinster, and Munster, was 156,883 acres. The number of acres devoted to this culture in the same provinces in 1870 was 194,910, showing a decrease of 38,027 acres in the year 1871.

EXPERIMENTAL FARMS.—Mrs. William Daviess, of Harrodsburgh, Kentucky, in a well-written article contributed to the press of that State, urges the establishment of experimental farms in each county, under the direction and control of county agricultural associations.

FULTZ WHEAT IN POTTAWATTAMIE COUNTY, IOWA.—Mr. D. B. Clark writes as follows from Council Bluffs, Iowa, under date of April 8:

September 17, 1871, I sowed four quarts Fultz winter-wheat. All winter-killed ex-

cept a little end of the piece protected by a board fence. October 7, sowed four quarts same variety, which is also all winter-killed. The past winter has been the most severe on winter-wheat we have had for many years. A good rain a few days ago has revived the little wheat still alive. September 8, I sowed one field of Iowa Amber. From present appearances, it will make half or two-thirds of a crop. On the following day I sowed another field of the same variety of wheat, which looks as though it would make three-fourths of a crop.

FULTZ WHEAT IN CALHOUN COUNTY, ALABAMA.—Mr. E. T. Read writes from Jacksonville, Alabama, under date of April 7:

Wheat is more backward in appearance than usual at this season of the year, but we have high hopes of a good crop. The Fultz wheat has stood the cold weather of winter best of any thus far. I think it will be a success here.

EXCELSIOR OATS.—Mr. John De Lyser, of Sheboygan County, Wisconsin, gives the following as the result of his experiments with Excelsior oats:

In the spring of 1869 I received from the Department of Agriculture 10 pounds of Excelsior oats. Owing to the wet season, I only succeeded in raising 1½ bushels, weighing 40 pounds to the bushel. In 1870, I sowed this seed on a half acre of ground, and secured 22 bushels of oats, weighing 42 pounds to the bushel. Last spring I sowed 11 bushels on four and one-half acres, and raised 40 bushels to the acre, (thrasher measure,) weighing 49 pounds to the bushel, being 61⅞ bushels (of 32 pounds to the bushel) per acre.

TAHITI COTTON.—In January, 1871, this Department received through Hon. Geo. M. Robeson, Secretary of the Navy, a specimen of the cotton staple grown in the island of Tahiti. The staple was of such unusual length and fineness that the then Commissioner at once wrote to Hon. Dorance Atwater, our consul at Tahiti, requesting him to procure from two to five bushels of the seed for experimental purposes in the extreme Southern or Gulf States. Secretary Robeson, in his letter transmitting the sample of cotton, informs the Department that the naval officer forwarding it states that in the year 1870 two million pounds of the cotton were sold in France at $1 per pound. About six bushels of this seed were received from Mr. Atwater, a few weeks ago, and five bushels of it were at once forwarded, in packages of one peck each, to leading cotton-growers of the South. The remainder, about one bushel, was forwarded to the Cotton-Growing Association of California.

TOUZELLE WHEAT.—Professor J. W. Mallet, of Albemarle County, Virginia, says of the White Touzelle wheat:

The grain ripened rather earlier than most of the wheat in this region; was full and plump, weighing 62½ pounds to the bushel, and was a good deal admired by many farmers, who considered it likely to prove a useful variety here.

FINE CROP OF SUGAR-CANE.—The Louisiana Sugar Bowl, of April 4, says that the Patont Brothers last year cultivated 106 arpents of plant, and 70 arpents of stubble-cane, with twenty hands, and made 225 hogsheads of sugar, weighing about 300,000 pounds. This is equal to a yield of 1,704½ pounds to the arpent, which, at an average of 7 cents per pound, yielded within a fraction of $119.32 per arpent. The same hands also made enough corn to supply the plantation during this year. Besides their own crop the Patont Brothers ground the small crops of eight or ten of their neighbors, amounting to about 75 hogsheads more, they receiving about one-third of this sugar, which swelled their crop to about 250 hogsheads last year.

WINE PRODUCT OF 1871.—In a paper read before the Mississippi Valley Vine-growers' Association at a recent session, Mr. Bush estimated the production of Missouri at 1,000,000 gallons; Illinois, 1,200,000; New York, 2,250,000; other States east of the Rocky Mountains 1,000,000; California, 7,000,000; total, 12,450,000. Mr. Bush predicts

"that Saint Louis is to become the center of this interest—another Bordeaux for the distribution of wines."

RAIN-FALL IN CALIFORNIA.—The rain-fall of the closing months of 1871 at San Francisco was greater than that of the same portion of any previous year since the settlement of the State. The rain-gauge shows that, prior to January 1, 29.29 inches had fallen. The next largest observed aggregate was in 1851, amounting to 19.31 inches. At Sacramento, up to December 31, the rain-fall was but 12.42 inches; at Stockton 10.80; at Turlock, in Stanislaus County, 8.52; Saint Andreas, up to December 23, 8.52; Shasta, up to December 26, 30.25; Nevada, up to December 30, 36.00; Los Angeles, up to December 30, 8.21.

MARKET PRICES OF FARM PRODUCTS.

Articles.		March.	April.
NEW YORK.			
Flour, superfine, State	per barrel	$6 10 to $6 50	$6 25 to $6 60
extra, State	do	6 70 to 7 50	6 70 to 6 45
superfine western	do	6 10 to 6 50	6 25 to 6 60
extra to choice western	do	6 70 to 9 50	6 65 to 9 50
extra southern	do	7 00 to 7 75	6 90 to 7 10
good to choice	do	7 80 to 9 50	7 15 to 9 50
Wheat, No. 1 spring	per bushel	1 57 to 1 59	1 55 to 1 59
No. 2 spring	do	1 52 to 1 56	1 50 to 1 53
winter, red, western	do	1 63 to 1 70	1 67 to 1 70
amber, western	do	1 70 to 1 73	1 70 to 1 77
white, western	do	1 72 to 1 80	1 73 to 1 80
Rye	do	92 to 93	88 to 88½
Barley	do	1 12½ to 1 14	80 to 83
Oats	do	52 to 54	53½ to 57
Corn, new western, mixed	do	70 to 70½	71 to 71½
old western, mixed	do		
Hay, shipping qualities	per ton	25 00 to ———	28 00 to 29 00
prime	do	27 00 to 32 00	28 00 to 34 00
Pork, mess	per barrel	13 50 to 14 10	12 75 to 13 00
prime	do	12 00 to 13 87	10 75 to 12 75
Beef, plain mess	do	9 00 to 11 00	8 00 to 9 50
extra mess	do	11 00 to 12 50	10 00 to 12 00
Lard	per pound	9¼ to 9¾	8½ to 8⅞
Butter, western	do	12 to 23	12 to 23
State dairy	do	21 to 37	24 to 40
Cheese, western dairy	do	14 to 16	14 to 17
State factory	do	15 to 17½	15 to 20
Cotton, ordinary to good ordinary	do	19⅜ to 21⅛	20⅜ to 22½
low middling to good middl'g	do	21⅝ to 23⅝	22⅝ to 24⅝
Tobacco, lugs, all grades	do	7½ to 8½	8 to 9½
common leaf	do	8½ to 10	9 to 10¼
Wool, pulled	do	70 to 87½	62 to 83
fub-washed	do	98 to 1 07	
California, spring clip	do		
fall clip	do	39 to 41	43 to ———
Texas, inferior to common	do		
BOSTON.			
Flour, western, superfine	per barrel	6 00 to 6 25	6 00 to 6 50
extras	do	7 00 to 8 25	6 75 to 8 00
choice	do	8 50 to 10 50	8 25 to 11 25
southern extras	do	7 00 to 7 50	7 00 to 7 25

Market prices of farm products—Continued.

Articles.	March.	April.
BOSTON—Continued.		
Flour, choice Baltimore ..... per barrel	$9 00 to $10 50	$9 00 to $11 60
Wheat ..... per bushel	1 60 to 1 65	1 50 to 1 90
Rye ..... do	90 to 95	92 to 95
Barley ..... do	75 to 1 20	75 to 1 20
Corn, southern yellow ..... do	77 to 78	77 to 78
western mixed ..... do	75 to 77	76 to 77
western yellow ..... do	77 to 78	77 to 79
Beef, mess ..... per barrel	10 00 to 12 00	10 00 to 12 00
extra ..... do	12 00 to 16 00	12 00 to 16 00
Pork, prime ..... do	12 00 to 12 50	11 00 to 12 50
mess ..... do	14 75 to 15 00	14 00 to 14 50
Lard ..... per pound	9¼ to 10	9 to 9¾
Butter, New York and Vermont ..... do	18 to 35	18 to 35
Canada, choice ..... do	27 to 30	29 to 32
western ..... do	17 to 27	13 to 28
Cheese, N. Y. and Vt., choice factory .. do	16½ to 17½	19 to 20
Ohio choice factory ..... do	14 to 16½	17 to 19
Hay ..... per ton	22 00 to 32 00	30 to 33
Wool, Ohio and Pennsylvania ..... per pound	75 to 90	75 to 90
Michigan ..... do	70 to 82	75 to 90
other western ..... do	70 to 80	75 to 82
California ..... do	35 to 55	35 to 55
Texas ..... do	35 to 50	35 to 50
combing fleece ..... do	90 to 92	92 to 95
PHILADELPHIA.		
Flour, superfine ..... per barrel	5 25 to 5 75	5 25 to 6 25
extras ..... do	6 00 to 8 50	6 00 to 8 50
family and fancy brands ..... do	9 00 to 10 00	10 00 to 11 00
Wheat, red, Penn. and western .... per bushel	1 60 to 1 62	1 76 to 1 77
amber ..... do	.....	1 80 to ———
Rye ..... do	90 to ———	87 to 88
Corn, yellow ..... do	65½ to 66	65 to ———
mixed, western ..... do	66 to ———	64 to 66
Oats, western white ..... do	55 to 56	54 to 55
Pork, mess ..... per barrel	14 00 to 14 75	13 00 to 13 25
Beef, mess, city packed ..... do	15 00 to 15 50	14 50 to 15 00
Lard ..... per pound	9¼ to 9¾	8¾ to 9
Cotton, middling ..... do	23 to 23½	23 to 23½
BALTIMORE.		
Flour, superfine ..... per barrel	6 25 to 6 75	6 50 to 7 00
extra ..... do	7 25 to 8 25	7 25 to 8 00
family and fancy ..... do	8 25 to 11 25	8 25 to 11 25
Wheat, Pennsylvania ..... per bushel	1 66 to 1 72	1 81 to ———
western ..... do	.....	.....
Maryland ..... do	.....	1 75 to 2 00
Rye ..... do	95 to 1 02	95 to 1 05
Corn, yellow ..... do	64 to ———	63 to ———
white ..... do	64 to 66	63 to 64
Hay, western ..... per ton	.....	.....
Pennsylvania and Maryland .... do	.....	.....
Pork, mess ..... per barrel	14 00 to 14 25	13 25 to 13 50
Butter, western, prime to choice .. per pound	21 to 27	.....
New York ..... do	35 to 38	.....
Cheese, western factory ..... do	.....	.....
eastern ..... do	.....	.....
Lard ..... do	9 to 9¼	8⅞ to 9
Cotton, ordinary ..... do	20¾ to ———	20 to 21½

Market prices of farm products—Continued.

Articles.	March.	April.
BALTIMORE—Continued.		
Cotton, middling ..... per pound..	$0 21⅝ to $0 22½	$0 22½ to $0 23
Tobacco, common to good lugs ..... do.....	——— to ———	——— to ———
common to medium leaf ..... do.....	——— to ———	——— to ———
Wool, unwashed, free from burs ..... do.....	——— to ———	——— to ———
tub-washed ..... do.....	——— to ———	——— to ———
CINCINNATI.		
Flour, superfine ..... per barrel..	6 75 to 7 00	6 75 to 7 00
extra ..... do.....	7 25 to 7 50	7 40 to 7 65
family ..... do.....	7 50 to 7 75	7 60 to 7 85
Wheat, No. 1 white ..... per bushel..	1 68 to 1 70	1 80 to 1 82
No. 2 white ..... do.....	——— to ———	——— to ———
No. 1 red ..... do.....	1 63 to 1 65	1 70 to 1 71
No. 2 red ..... do.....	1 60 to 1 62	1 68 to 1 77
Corn, white ..... do.....	50 to 51	46 to 48
yellow ..... do.....	——— to ———	——— to ———
Oats, white ..... do.....	44 to 45	42 to ———
No. 1, mixed ..... do.....	43 to ———	40 to ———
Rye ..... do.....	91 to 93	90 to 92
Barley, winter, No. 2 ..... do.....	70 to 80	65 to 75
spring, No. 2 ..... do.....	70 to 80	70 to 73
Hay, tight-pressed, com. to choice .. per ton...	16 00 to 23 00	16 00 to 23 00
loose-pressed, prime to choice .... do.....	17 00 to 21 00	17 00 to 21 00
Pork, mess ..... per barrel..	13 00 to 13 25	12 00 to ———
prime ..... do.....	——— to ———	——— to ———
Beef, plate ..... do.....	13 00 to ———	13 00 to 13 50
hams ..... do.....	26 00 to 28 00	26 00 to 28 00
Lard, prime, steam ..... per pound..	9⅜ to 10½	8⅝ to ———
Butter, western reserve ..... do.....	23 to 25	30 to 32
choice central Ohio ..... do.....	21 to 23	25 to 28
Tobacco, lugs ..... do.....	9 to 18	8 to 18
leaf ..... do.....	9 to 30	9 to 30
Wool, tub-washed ..... do.....	75 to 78	75 to 78
fleece-washed, manufact'g ..... do.....	55 to 60	55 to 60
fleece-washed, combing ..... do.....	55 to 60	55 to 60
unwashed, manufacturing ..... do.....	45 to 48	45 to 48
unwashed, combing ..... do.....	45 to 50	45 to 50
pulled ..... do.....	72 to 75	72 to 75
CHICAGO.		
Flour, winter, extra ..... per barrel..	7 25 to 9 00	8 50 to 9 00
spring, extra ..... do.....	4 50 to 6 75	5 50 to 7 00
Wheat, No. 1 spring ..... per bushel..	1 31 to ———	1 28 to 1 30
No. 2 spring ..... do.....	1 23¾ to 1 25	1 20 to 1 21
No. 3 spring ..... do.....	1 18 to ———	1 15 to 1 16
Corn, No. 2 ..... do.....	37 to 39¼	38 to 39¼
rejected ..... do.....	——— to ———	——— to ———
Oats, No. 2 ..... do.....	31⅝ to 32	30⅝ to 30¾
rejected ..... do.....	29 to ———	——— to ———
Rye, No. 2 ..... do.....	73 to 75½	68 to 68½
Barley, No. 2 ..... do.....	56 to 66	50 to ———
Hay, timothy, (on track) ..... per ton..	13 00 to 14 00	13 00 to 14 00
prairie ..... do.....	9 00 to 10 50	9 00 to 10 00
Pork, mess ..... per barrel..	11 95 to 12 60	11 30 to 11 35
extra ..... do.....	11 40 to 11 50	——— to ———
Beef, mess ..... do.....	8 75 to 9 00	8 75 to 11 00
Lard ..... per pound..	8⅝ to ———	8⅛ to 8¾
Butter, choice dairy ..... do.....	25 to 27	25 to 27
fair to choice tub and firkin .. do.....	16 to 22	16 to 22

Market prices of farm products—Continued.

Articles.	March.	April.
CHICAGO—Continued.		
Cheese, New York factory ..... per pound..	$0 17 to $0 17½	$0 20 to $0 21
western factory ..... do.....	13 to 16	15 to 18
Ohio factory ..... do.....	16 to ———	18 to 19
Wool, medium fleece ..... do.....	60 to 66	62 to 68
unwashed, medium ..... do.....	38 to 45	40 to 50
tub-washed ..... do.....	79 to 82	63 to 85
SAINT LOUIS.		
Flour, superfine ..... per barrel..	5 75 to 6 00	5 50 to ———
extra ..... do.....	6 25 to 7 35	6 00 to 7 50
choice ..... do.....	8 10 to 8 75	8 00 to 8 85
Wheat, red ..... per bushel..	1 65 to 1 79	1 70 to 1 90
white ..... do.....	1 65 to 1 75	1 78 to 1 97
spring ..... do.....	1 36 to 1 45	1 43 to 1 45
Corn, mixed ..... do.....	40 to 50	39 to 52½
yellow ..... do.....	39 to 51	40 to 51
white ..... do.....	55 to 58	46½ to 55
Oats, white ..... do.....	36 to 43½	37 to 43
mixed ..... do.....	36 to 42	34¾ to 41½
Rye ..... do.....	80 to 83	76 to 77
Barley, winter ..... do.....	70 to ———	60 to 80
spring ..... do.....	62½ to ———	50 to 61½
Hay ..... per ton..	15 00 to 22 00	17 00 to 20 00
Pork, mess ..... per barrel..	12 75 to 13 00	11 75 to 12 00
Lard, prime steam ..... do.....	8½ to 8¾	.....
kettle ..... do.....	8¼ to 8¾	8¼ to 9¼
Butter, choice ..... per pound..	22 to 35	24 to 40
medium to fair ..... do.....	15 to 22	15 to 24
Cheese, choice factory ..... do.....	16½ to 17	18½ to 22
Cotton, middling ..... do.....	21 to ———	22 to ———
Tobacco, lug ..... per cwt..	4 20 to 10 75	6 80 to 8 25
common leaf ..... do.....	.....	8 25 to 8 75
medium to good leaf ..... do.....	.....	9 00 to 12 00
Wool, tub-washed ..... per pound..	80 to 85	75 to 77
fleece-washed ..... do.....	.....	.....
unwashed medium ..... do.....	47½ to 50	45 to 47
NEW ORLEANS.		
Flour, superfine ..... per barrel..	6 62½ to ———	6 50 to ———
extras, (according to grade) .... do.....	7 50 to 11 50	7 25 to 11 00
Corn, white ..... per bushel..	75 to 85	75 to 80
yellow ..... do.....	73 to 78	72 to 75
mixed ..... do.....	73 to 78	72 to 75
Oats ..... do.....	53 to 55	55 to 58
Hay, choice ..... per ton..	31 00 to 32 50	37 00 to 40 00
prime ..... do.....	28 00 to 30 00	35 00 to ———
Pork, mess ..... per barrel..	14 50 to 14 75	13 25 to ———
Beef, mess, (Texas) ..... do.....	11 00 to 12 00	11 00 to 12 00
Lard, tierce ..... per pound..	9½ to 9½	9½ to 9½
keg ..... do.....	10 to 10½	9½ to 10¼
Butter, choice western ..... do.....	22 to 25	30 to ———
Goshen ..... do.....	34 to ———	40 to ———
Cheese, choice factory ..... do.....	17 to ———	19 to ———
western reserve ..... do.....	16 to ———	18 to ———
New York cream ..... do.....	18 to ———	20 to ———
Cotton, ordinary to good ordinary .... do.....	19 to 20¾	18½ to 21¾
middling to good middling ... do.....	21⅞ to 22⅝	22¼ to 23¼
Tobacco, lugs ..... do.....	8 to 8¾	8 to 9
low-leaf ..... do.....	9 to 9½	9 to 9½
medium ..... do.....	9½ to 10½	9¾ to 11

Market prices of farm products—Continued.

Articles.	March.	April.
SAN FRANCISCO.		
Flour, superfine.....per barrel..	$5 50 to ———	$4 75 to ———
extra super.....do.....	5 75 to $6 00	5 25 to $5 50
higher grades .....do.....	6 25 to 6 50	5 75 to 6 25
Wheat, State.....per cental..	2 05 to 2 25	1 75 to 1 95
Oregon .....do.....	2 15 to 2 25	1 85 to 1 95
Corn, white.....do.....	2 10 to 2 15	1 50 to ———
yellow .....do.....	1 75 to 1 80	1 45 to 1 50
Hay, State.....per ton..	14 50 to 23 50	15 00 to 22 50
Pork, mess.....per barrel..	15 00 to 17 50	17 00 to 18 00
prime.....do.....	15 00 to 16 00	16 00 to 17 50
Beef, mess .....do.....	13 50 to 22 00	12 00 to 22 00
Lard .....per pound..	11¼ to 13	11½ to 13
Butter, overland .....do.....	20 to 25	20 to 22½
California .....do.....	25 to 32½	20 to 25
Oregon .....do.....	15 to 20	15 to ———
Cheese .....do.....	18 to 20	16 to 22
Wool, native.....do.....	30 to ———	35 to 40
California .....do.....	35 to 45	45 to 55
Oregon.....do.....	40 to 45	40 to 50

MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

MAY AND JUNE, 1872.

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1872.

MONTHLY REPORT.

DEPARTMENT OF AGRICULTURE,
Statistical Division, June 22, 1872.

SIR: I respectfully present, for publication, a report of the condition of crops for the month of June, with collections of statistics and records of the condition of agriculture, from home and foreign sources; articles upon Northern farming and Southern planting, the deterioration of cotton and sugar-cane, and the epizootic diseases of swine; and notes of current work of the entomologist, chemist, and botanist, a record of scientific discovery in the direction of rural arts, and miscellaneous facts from original sources.

J. R. DODGE,
Statistician.

Hon. FREDERICK WATTS,
Commissioner.

CONDITION OF THE CROPS IN JUNE.

WHEAT.

The returns for June have been carefully examined, percentages of area and condition have been tabulated, and averages calculated with reference to the comparative wheat area of each county. This compound method—and only true one of obtaining a State average—involves an immense amount of labor, which cannot be done in a day; yet the result is a reliable and satisfactory expression of the deliberate views of the county statistical boards, and may be received as the only complete and approximately accurate review of the wheat prospects of the country in the first week of June, 1872.

The following tabular statement of the general character of the returns from nine hundred and three counties, including a large proportion of the wheat area of the country, shows that 48 per cent. are unfavorable, 22 present an average condition, and 30 per cent. are above average.

	Average.	Above average.	Below average.	Total.
	Counties.	*Counties.*	*Counties.*	
Maine	6	3	2	11
New Hampshire	6	.....	1	7
Vermont	5	4	1	10
Massachusetts	4	.....	1	5
Connecticut	3	.....	1	4
New York	1	2	30	33
New Jersey	1	.....	11	12
Pennsylvania	1	.....	37	38
Delaware	1	.....	2	3
Maryland	.....	.....	13	13

	Average.	Above average.	Below average.	Total.
	Counties.	*Counties.*	*Counties.*	
Virginia	11	5	36	52
North Carolina	16	20	12	48
South Carolina	9	2	3	14
Georgia	19	27	11	57
Alabama	4	15	2	21
Mississippi	6	3	.....	9
Texas	3	7	.....	10
Arkansas	3	8	2	13
Tennessee	7	26	4	37
West Virginia	3	4	21	28
Kentucky	14	18	6	38
Ohio	2	2	48	52
Michigan	5	5	25	35
Indiana	8	10	38	56
Illinois	10	16	26	52
Wisconsin	10	16	4	30
Minnesota	9	11	1	21
Iowa	9	37	4	50
Missouri	4	8	55	67
Kansas	3	1	28	32
Nebraska	1	11	2	14
Oregon	8	1	2	11
California	5	8	6	19
Total	199	270	434	903

A calculation of the percentage of area as given in the general tables which follow this crop report makes the depreciation in the total area 2 per cent. The wheat crop of 1871 was estimated at 130,000,000 bushels, at the close of the harvest, with an average yield of 11½ bushels per acre. If 12 bushels be taken as a fair average, a yield of 11½ would be a depreciation of 4⅙ per cent. The October returns of estimated product made the total depreciation nearly 7 per cent. The total average of condition in the June returns of the present year is 94, which would indicate a product (prospects continuing unchanged till harvest) of fully 220,000,000 bushels. This would be 67,000,000 bushels less than the unprecedented crop of 1869.

An increase of area in spring-wheat is reported in ten counties in Maine, and a decrease in one (Piscataquis) of 5 per cent. Somerset gives 15 per cent. increase, and Aroostook 10, the average for all the counties reported being 8 per cent. Very little winter-wheat is grown, but there appears to be an increase in the area. Only Lincoln and Sagadahoc report low condition, and the general average is 1 per cent. above.

Only two counties in New Hampshire—Grafton and Strafford—give diminished acreage. Sullivan and Merrimack show an increase. The acreage is equal to the area of the last crop. All except Strafford report 100 for condition, making the general average 99.

Ten counties in Vermont make returns of spring-wheat, seven reporting the same area as last year, Orleans 105, Chittenden 110, and Orange 115. In condition only Bennington is below average, Addison and Orange 120, and the average of all 106.

In Massachusetts a diminution of 4 per cent. of its very small area appears. In Franklin County, which produces nearly half of the winter-wheat of the State, and very little spring-wheat, the area of the former has been reduced 5 per cent., while its condition is 100, or average. Worcester, which grows more than half of the spring-wheat of the State,

makes an average, both in area and condition, while the general average of the State, both for winter and spring, is 98.

The returns from Connecticut average 95 per cent. for area, and 88 for condition. Returns from several counties do not include wheat.

Of thirty-three counties of New York reporting winter-wheat, (representing six-sevenths of the crop,) only Warren and Westchester, which grow very little wheat, return condition higher than 100, and Putnam 100. The general average is for winter 68, and 91 for spring; representing a deficiency in the wheat-crop of New York of about 28 per cent. Five counties—Monroe, Niagara, Livingston, Ontario, and Genesee—which produced more than four millions of bushels in 1859—average this season but 64 in condition. The total area of winter wheat is 98 per cent., only Wayne, Niagara, Steuben, Dutchess, Schuyler, Schenectady, and Delaware, making returns below 100, while Warren, Wyoming, Broome, Yates, Monroe, Oneida, Erie, and Jefferson make returns above 100. The wheat prospects indicated by the April returns, which were not very cheering, have been impaired by drought.

Twelve counties in New Jersey, which represent four-fifths of the total product, average 98 per cent. for area and 70 for condition. Only Essex, which is unimportant as a wheat county, returns average condition, while Hunterdon, the first in wheat production, returns 25.

A reduction of one-tenth of the wheat area of last year is indicated in Pennsylvania, and a condition of 30 per cent. below an average is presented. The reports represent thirty-eight counties, of which Clearfield alone returns 100. Had the season been propitious since the opening of spring, the losses by winter-killing would have been by no means irreparable—scarcely even formidable. The York correspondent declares the prospect the worst one for thirty-seven years. Drought, cool winds, and the fly are among the evils added to winter-killing.

We have returns from thirteen counties in Maryland, which together produced 86 per cent. of the wheat reported by the last census. No return gives an average condition, the highest being 85 for Calvert. Frederick, which usually produces one-fifth of the crop of the State, is credited with 70; Montgomery sends the same figure; and other counties make still worse returns, as 60 for Howard and Queen Anne; 50 for Baltimore and Talbot; 30 for Cecil; 25 for Carroll, Washington, and Harford; and 20 for Kent.

Delaware has been afflicted with drought, reducing condition to 70, while the area in comparison with that of last year is 96.

Fifty-two counties of Virginia indicate a loss of 2 per cent. in area, and a depreciation below an average of 15 per cent.; only five counties indicate condition above 100; thirty-six below, and eleven 100. Those standing highest are Gloucester, Montgomery, Giles, Scott, and Henry. Loudoun, which should yield half a million bushels, is placed at 60, and Augusta, which stands next in production, is put at 80.

South of Virginia, reports are more favorable. North Carolina gives an average of 101, both for area and condition. Of forty-eight counties reporting, only twelve place condition below 100. The superior appearance of drilled wheat is noted.

In South Carolina, area is represented by 96, and condition by 97.

Fifty-seven counties in Georgia make wheat returns. Very little complaint of rust or insects is made, and the weather has been quite favorable. The area is averaged at 98, and condition rises to 105. Only eleven returns of low condition are made.

In Alabama few counties produce wheat except to a very limited extent. Twenty-one make reports which are quite promising. Area 105, condition 115.

Only nine returns of wheat come from Mississippi. These indicate a decrease of 5 per cent. in area, and place condition at 104.

From Texas only ten counties make returns. These indicate an increase of 15 per cent. in area, and place the average condition high, at 117.

Wheat is in fine condition in Arkansas, (110,) though there is always quite too small an area, and that of the present year has declined 10 per cent. from last year.

Thirty-seven counties in Tennessee make returns of wheat, only four of which present condition below 100. It is noted that better tillage is beginning to prevail, and that a good harvest is assured from lands properly tilled. The reported area is 3 per cent. greater than that of last year, and condition high, averaging 117.

In West Virginia there is no decrease in the wheat area, but its condition is not promising, being represented by 85; Jefferson, a county famous for flourishing wheat-fields, by 62. Three-fourths of the twenty-eight counties reported make low returns of condition. There was some injury by winter-killing, and more by drought in May.

A diminution in area of 8 per cent. is apparent in Kentucky, but the crop is in superior condition, averaging 108, only six counties standing below 100 of the thirty-eight reporting. Seven counties, representing one-fifth of the crop of the State—Christian, Hardin, Jefferson, Mercer, Shelby, Spencer, and Warren—average 115 in condition.

Returns from fifty-three counties in Ohio indicate a reduction of 12 per cent. in the area, and 22 in condition. Ten counties, Butler, Crawford, Darke, Fairfield, Greene, Logan, Miami, Montgomery, Seneca, and Stark, representing one-fourth of the usual product of the State, average a depreciation of 20 per cent. in condition. Sciota and Butler are placed at 110, and Fairfield and Huron stand at 100, Trumbull and Delaware reporting 95; Hamilton, Geauga, and Seneca, 90; Holmes and Mahoning 85, and all others falling still lower. The reported causes of damage are freezing, drought, the Hessian fly, and poor tillage.

The prospect is almost equally gloomy in Michigan. A reduction of 8 per cent. in area is reported, and the average condition is placed at 75. Thirty-five counties are represented, among which are Oakland, Washtenaw, Jackson, Kalamazoo, Cass, Lenawee, Livingston, Barry, and Genesee, which produce nearly as much wheat as all the remaining counties of the State. The counties named indicate a reduction of 8 per cent. in area, and a condition 30 per cent. below average. Drilled wheat is more promising than that sown broadcast.

In Indiana the area is represented by 94, condition by 85. There is great variety in the returns; among those counties which have produced half a million bushels each, Carroll stands at 100, Shelby 95, Park and St. Joseph 80, Johnson 75, Kosciusko 60, Randolph 50. Fifty-six counties are reported, of which thirty-eight are below an average in condition, and but ten above. In Kosciusko frost as late as May 3 injured the crop. In some places the fly is reported, in others the chinch-bug, while drought has been general, though of unequal duration, and at some places it still continues. The superior advantage of drilling and good tillage is repeatedly stated.

In Illinois the Hessian-fly is found in many places, and the chinch-bug is troublesome. The area in winter wheat is undiminished,

but condition is 20 per cent. below average. The following counties, which produced nearly eight million bushels in 1869, return condition, Saint Clair and Monroe 110; Madison 100; Clinton, Randolph, and Perry 90; Lawrence 75; Macoupin and Montgomery 50; Sangamon 25. The remainder of the forty-six reports of winter wheat present a similar variation. In spring wheat there is a reduction of one-fourth in area, while its condition is a full average. Among the counties producing spring wheat largely the following report very favorably: Rock Island and Carroll 110; Ogle and Boone 105; Lee 120; Bureau 100. Of twenty-seven reporting spring wheat only four are placed below 100, viz: Champaign, Menard, Massac, and Putnam.

The wheat prospect is good in Wisconsin: area of spring wheat, 98; condition, 104. Thirty counties report spring wheat, of which Brown, Iowa, and Washington only fall below average. The following counties, representing one-third of the crop of the State, average 105, viz: Walworth, 120; Green Lake, Grant, and Jefferson, 110; Saint Croix, Fond du Lac, (these two having grown 1,500,000 bushels each,) 105; Washington, 95; Iowa, 90. Very little winter wheat is grown.

The prospect is cheering in Minnesota. Winter wheat is low in area and condition, but there is never fall-sown wheat enough for mention as affecting the general crop. The area of spring wheat is 101, of winter 76, but the deficiency of the latter does not amount to a quarter of one per cent. of the total average. In condition the average for spring wheat is 106. Returns are received from twenty-one counties, yet five of the number produce nearly half of the wheat of the State, viz: Olmstead, 100; Fillmore, 125; Dakota, 120; Goodhue, 100; Wabashaw, 120.

Forty-nine counties in Iowa make returns of spring wheat, and eighteen of winter. The area of the former is 106; of the latter 102; but there are 30 acres of spring wheat to one of winter. The condition of winter is averaged at 80; of spring at 111. Only three returns (from Appanoose, Henry, and Carroll) place spring wheat below average: eight return average; and thirty-eight above average. The following eleven counties, which produced ten millions bushels in 1869, average an increased area of 4 per cent., and are placed at 12 per cent. above average condition, viz: Black Hawk, Clayton, Tama, Winneshiek, Clinton, Jasper, Linn, Alamakee, Cedar, Delaware, and Marshall.

Missouri comes nearer a failure than any other Western State. The area of winter-wheat appears to be reduced 8 per cent., and condition is 42 per cent. below average. Spring-wheat is doing comparatively well, but its proportion to winter is only as 1 to 13. There are reports of winter-wheat from sixty-seven counties, and only Saint Genevieve, Crawford, McDonald, Reynolds, Wayne, Carter, and Perry stand above average. "A failure" is reported from Holt and Moniteau. The late-sown winter-wheat was severely injured by freezing, and the spring has been unfavorable. Chinch-bugs in vast numbers have attacked some localities. Again and repeatedly comes the statement that drilled wheat is not winter-killed in dry soil, and that that sown broadcast is very poor, and in some cases has been plowed up. And yet some farmers and agricultural writers have not learned of the benefit of drilling and draining as a protection to wheat.

In Kansas the area is nearly equally divided between winter and spring wheat, with a slight preponderance of the latter. The result of the present crop will tend to make the disparity wider. The area of winter-wheat averages 62, of spring 140; condition of winter 46; of spring 108. There are thirty returns of the former, and twenty-nine of the latter. Only Sedgwick, Shawnee, Howard, and Linn, of the spring-

wheat counties, report low condition; only Crawford, Jefferson, and Washington come up to an average in winter-wheat.

The prospect in Nebraska is quite promising. Though winter-wheat is in very poor condition, it is grown upon a small area, and spring-wheat is reported at 14 per cent above an average, with an increase of 13 per cent. in acreage. Cass, Burt, and Lancaster, together producing half a million bushels, average 112 in condition. There is no report of low condition, except in winter-wheat.

Our returns from California are not full, though representing about half of the wheat area of the State. A large increase of area is shown, and the promise of a large yield is general. The returns of correspondents, together with information from outside sources, lead to the belief that an increase of at least ten to twelve million bushels will be made.

An increased area is also apparent in Oregon, and the prospect is good for a nearly average crop.

The following very brief extracts from remarks accompanying the statistical returns will serve, not to give a complete idea of the wheat prospect, which is more accurately presented in the tables and the summary preceding, but to illustrate the local peculiarities of the crop:

MAINE.—*York:* Wheat looks finely where it was not covered with snow and ice. *Cumberland:* Spring-wheat looks well.

VERMONT.—*Orange:* Winter crop fine. *Grand Isle:* Winter-killed. *Orleans:* Small but looks well.

NEW YORK.—*Tioga:* Materially injured by drought. *Jefferson:* Half winter-killed. *Livingstone:* Injured by April drought. *Yates:* Poorest prospect known. *Genesee:* Injured by extreme cold of winter; good rain may improve it, but it will be below average. *Chatauqua:* Poorest ever known; growth small; no heads yet in sight. *Kings:* What is left of the crop looks well; shortened by extreme winter cold. *Wyoming:* Shortened by drought. *Otsego:* Badly winter-killed. *Ontario:* Poor. *Erie:* Stands well, but is small. *Seneca:* Almost a failure through drought.

NEW JERSEY.—*Warren:* Will not yield over a half crop. *Sussex:* Looks badly. *Mercer:* But little more than a half crop, on account of the cold dry winter and spring: fly in some fields.

PENNSYLVANIA.—*Armstrong:* Spring drought gave but little chance to recover from the winter freeze. *Berks:* Winter and spring unpropitious. A few fields have been plowed up for corn. *Greene:* Looks badly. *Lycoming:* Badly-winter killed, and still further injured by late spring. *Susquehanna:* Badly winter-killed. *Lancaster:* Not over 8 bushels average per acre; the fly threatens what the hard winter has left. *Montgomery:* Badly winter-killed; many fields plowed for corn. *York:* Crop shorter than for thirty-seven years. *Fulton:* Fultz wheat better than any other variety. *Centre:* Drought has made many fields bare. *Huntingdon:* Injured by hard winter and dry spring. *Chester:* Injured by cold winter and spring, and also by the fly. *Beaver:* Shortened by drought. *Indiana:* Northwest winds blew the dry earth from the roots of the wheat. *Mifflin:* The crop a failure; largely winter-killed. *Tioga:* Injured severely by fall drought and winter freeze. *Northumberland:* Prospects poor: Fultz wheat better than the common. *Union:* Crops tolerable; greatly improved by late rains. *Lawrence:* Half crop. *Fayette:* Badly injured by March winds.

DELAWARE.—*New Castle:* Severely affected by drought.

MARYLAND.—*Carroll:* Severe winter and spring with the fly, have reduced the crop one fourth. *Howard:* Acreage decreasing; farmers say the crop does not pay. *Baltimore:* Fly and other insects troublesome. *Queen Anne:* Not over a half crop possible; stands thinly on the ground; straw short; without speedy rain the heads will not be filled out. *Montgomery:* Fly at work; joint worm expected to follow. *Cecil:* A few fields tolerable, but the general condition never was worse; some fields plowed up. *Kent:* Dried up. *Washington:* Most general failure since 1836; many fields will not be cut. *Charles:* Recent rains have raised the wheat crop to a fair promise.

VIRGINIA.—*Culpeper:* Early drilled winter wheat 90 per cent; early broadcast 50; later wheat suffered severely from freezing, broadcast more than drilled. Fultz wheat from the Department 105; Touzelle, 115; Ushak, 112. *Spottsylvania:* Heads low but well filled. *Henrico:* Crop still fine in spite of serious injuries. *Botetourt:* Injured by drought, fly, and joint worm. *Stafford:* Winter crop badly injured by cold and drought. *Middlesex:* Heads low, but prospects fair for a good crop; Fultz wheat making a splendid crop; better than any other. *Charlotte:* Short, but excellent: no rust. *Craig:* Below average. *Lancaster:* Cold and drought will prevent rust. *Giles:* Above average promise. *Surrey:* Acreage decreased; crop thin and small.

Richmond: Winter-killed and cut down by drought; Fultz wheat vigorous. *Fluvanna:* Wheat backward, but filling well; Fultz wheat especially promising; tillering and heading finely. *King and Queen:* In bad condition; fears expressed that the crop will be abandoned. *Pulaski:* Stood the winter well, but the dry, cool spring and the fly have injured it. *Orange:* Recent rains have been of great benefit to wheat early sown on good land, but most of the fields are very poor. *Highland:* Injured by winter freeze and spring drought. *Madison:* Wheat improved by late rains, but cannot make a full crop. *Rockingham:* Not even a half crop. *Rappahannock:* Heads short and low. *New Kent:* Looks remarkably well. *Prince George:* Acreage reduced; drought has kept off rust from early sown fields. *Bath:* Looks badly; Fultz wheat much better. *Amherst:* A fine prospect; seriously injured by drought. *Mecklenburgh:* Badly winter-killed. *Nelson:* Crop short. *Augusta:* Worse than for many years. *Clarke:* Crops are promising; much better on the iron-ore lands west of the Shenandoah. *Prince William:* Suffering severely for rain. *King George:* Greatly improved by recent rains.

North Carolina.—*Randolph:* Prospect fair. *Mecklenburgh:* Better than for many years; drilled Fultz wheat very promising. *Chowan:* Very ordinary. *Camden:* Wheat culture almost broken up by rust, scarce fifty acres sown where once there were many thousands. *Rowan:* Heads small and not well filled; straw short; drought, fly, and rust complained of. *Bladen:* Fultz wheat very fine. *Stokes:* Heads well filled; rust on the blades, but too late for the grain; fly in a few fields. *Clay:* Acreage reduced ten per cent., but prospect good. *Jackson:* Fultz wheat looks well; stood the winter better than the Tappahannock. *Pasquotank:* Not half a crop; rust reported. *Gaston:* Crop a full average. *Moore:* Above average. *Perquimans:* Rusted as usual; prospect poor. *Alamance:* On rich lands recent rains have greatly recompensed the losses from winter-killing and the fly. *Rockingham:* A fine crop. *Haywood:* Winter wheat a good stand but heads low. *Stanley:* Early wheat promising; later, somewhat rusted: Fultz wheat tillers well, has a large head and promises a full crop. *Montgomery:* Crop over average.

South Carolina.—*Greenville:* Early-sown fall wheat looks well; late-sown suffered from drought. *Union:* When sown before December, on well-prepared ground, the crop looks well. *Chesterfield:* Somewhat winter-killed, but looks well, especially Fultz wheat. *Lexington:* Dry weather favorable; first-rate yield promised. *York:* Looks well. *Anderson:* More than half the crop is out of danger. *Orangeburgh:* Looks very well.

Georgia.—*Muscogee:* Looked well during winter and spring, but lately rusted. *Murray:* Crop, a full average. *Hancock:* Fultz wheat looking well. *Putnam:* Area small; yield good. *Oglethorpe:* Winter crop daily improving; culture careless. *Fayette:* Injured by drought. *Forsythe:* Looks finely, and promises a full yield of good grain. *Wilkes:* Cut earlier than ever; Tappahannock, the best for flour, but ten or fifteen days late. *Cobb:* No rust; splendid yield promised. *Brooks:* Fultz wheat luxuriant, but grains small. It would do well under good conditions. *Marion:* Fultz wheat looks fine. *Chattooga:* Prospect materially improved. *Sumter:* Acreage small; crop injured by drought and rust. *Butts:* Stand poor, but grain good; suffered from wet and cold. *Madison:* Dry weather has made the crop very fine. *Milton:* Crop fine; well filled; no rust.

Alabama.—*Marshall:* Wheat harvest the best in twenty years. *Lawrence:* Unusually promising. *Clark:* Department wheat rusted. *Calhoun:* Full average; Fultz wheat fine; from 50 to 75 grains on each head; ripens as soon as other wheat sown fifteen days earlier; no rust. *Limestone:* Some rust on blades, but no serious damage.

Mississippi.—*Lee:* Promises an extraordinary yield.

Texas.—*Johnson:* Crop unusually large. *McLennan:* Average yield, 25 to 30 bushels per acre. *Gillespie:* Tappahanock will yield largely; better than last year. *Upshur:* Acreage about the same as last year; condition superior. *Red River:* Harvest ten days late; yield large. *Grayson:* Tappahannock and Fultz wheat fine. *Hunt:* Fultz wheat a larger yield than native grain.

Arkansas.—*Independence:* Fultz wheat exceedingly promising.

Tennessee.—*Loudon:* Filling better than for several years. *Jefferson:* Fultz wheat sowed late, but looks fine. *Henry:* Looks fine; greatly improved. *Greene:* Generally promising; fly reported in some localities; Fultz shows larger heads than the Tappahannock; no rust. *Sullivan:* Damaged by the fly; many fields pastured or plowed up; a good harvest will be gathered from well-prepared lands. *Weakley:* Yield better than for many years; crops lately have been poor. *Wilson:* Area less than last year, but the quantity produced will be greater. Early sown on good land, wheat will yield this year above average; seeded late on thin soil, it will be poor; some rust on blades. *Coffee:* Rust has appeared. *Rhea:* Good crop. *Putnam:* Severely damaged by freezing, but now looking better. *Dickson:* Rust on blades. *Hancock:* Acreage reduced; rust in some places, but the condition promising on the whole. *Granger:* Promising, especially Fultz wheat. *Roane:* Thin stand, but fine heads; Department wheat especially promising. *Robertson:* Early wheat fine; late shortened by drought. *Knox:* Improved since the close of the May drought; Fultz especially fine. *Wayne:* Good. *Monroe:* Straw light and blades rusted, but heads filling well; quality excellent. *Lincoln:* Blades rusted.

KENTUCKY.—*Shelby:* Thin, but heading beyond expectation. *Nicholas:* Fair crop of winter wheat. *Mercer:* Crop abundant. *Daviess:* Recent rains have redeemed an unpromising crop; prospect better than for ten years. *Laurel:* Injured by heavy rains. *Grant:* Badly winter-killed; Fultz wheat looks badly, though the spring has been favorable. *Henry:* Crops fair. *Laurel:* More promising than for several years. *Butler:* Beginning to rust. *Rockcastle:* Indications of rust. *Anderson:* As fine as ever known. *Graves:* Yield quadruple any former one. *Adair:* Crop not large, but looks well.

WEST VIRGINIA.—*Pocahontas:* Suffered from winter freezing. *Hardy:* Not over a half crop. *Harrison:* Winter killed and injured by drought. *Randolph:* Below average; winter-killed. *Taylor:* Better than last year. *Cabell:* Below average. *Nicholas:* Half crop; winter-killed. *Tyler:* Half a crop.

OHIO.—*Noble:* Not over a fourth of a crop; winter-killed, and injured by drought. *Logan:* Protracted fall drought, secured but a feeble growth. A large area has been plowed up for oats. *Scioto:* Seasonable spring rains will probably compensate for reduced acreage; spring-wheat looks well. *Warren:* Badly injured by frost; spring crops abandoned. *Medina:* May average two-thirds of a crop; spring-wheat acreage reduced one-half. *Defiance:* Retarded by fall and spring drought. *Monroe:* Some good fields, but many will not pay for cutting. *Pickaway:* Badly winter-killed, and afterward injured by drought and flies; not over a half crop. *Fairfield:* Badly frozen out *Coshocton:* Winter-wheat almost a total failure. *Wyandot:* Plenty of fly. *Greene:* Fly bad, eating whole fields. *Allen:* Injured by hard winter and dry spring. *Franklin:* Severe drought, poor tillage, and Hessian fly have made the poorest crop of winter wheat for many years. *Crawford:* Not half a crop; broadcast nearly all winter-killed; early drilled as good as usual. *Carroll:* Largely winter-killed. *Henry:* Early sown fields a full average. *Delaware:* Crop exceeds expectations. *Lorain:* Spring-wheat never better. *Adams:* Crops twenty-five days late; greatly improved during the first half of May. *Champaign:* Badly winter-killed; drought and fly injurious. *Geauga:* Greatly improved; nearly average.

INDIANA.—*Elkhart:* Below average, but greatly improved by late rains. *Ohio:* Greatly improved by seasonable rains and fine weather. *Madison:* Very poor before the late rains, which have greatly revived the crop. *Gibson:* Fine since the spring rains, but threatened by the army worm. *Perry:* Fair crop. *La Grange:* Early sown on well-prepared ground promises a good crop; where sown on corn ground just cleared the wheat will not be worth cutting; late rains favorable. *Kosciusko:* Injured by frost May 3. *Johnson:* Not over a half crop. *Washington:* Many fields injured by the fly. *Miami:* Australian white wheat from the Department looks well. *Scott:* Tappahannock injured 25 per cent. by fly; Australian white came up finely, but has been almost swept by the fly; Fultz doing well. *Morgan:* Wheat ranges from extra good to very indifferent. *Noble:* Late rains have improved wheat; early drilled a full average; late sown but a half crop; on corn ground not over a half crop; the county will average about two-thirds of a crop. *Saint Joseph:* Winter crop looks well in spite of bad weather. *Randolph:* Never looked worse; early sown badly frost-killed. *Wayne:* Almost a total failure from fly; perhaps one acre in ten will be cut. *Owen:* Rains too late except to fill the berry. *Marshall:* Harvest late. *Hamilton:* Good crops in some fields; almost none in others. *Posey:* Prospect good; Fultz entirely winter-killed. *White:* Wheat will head short without speedy rain. *Stark:* Spring-wheat from the Department looks splendid. *Warren:* Winter crop good in some places, in others not; chinch-bug at work. *Knox:* Improved to nearly an average. *Franklin:* Upland wheat generally damaged by the fly; on stout land and bottoms it looks well; Australian white spring ruined by the fly; Fultz looks as well as any other, heading early. *Harrison:* Thin on the ground and injured by the fly. *Dubois:* Well headed. *Decatur:* Badly damaged by dry fall and cold winter; very thin except where drilled on fallow ground; fly at work.

ILLINOIS.—*Pike:* Not half a stand; too deeply sown. *Lee:* Looks fine. *Tazewell:* Insects in the crop. *Cumberland:* Harvest two weeks late. *Fayette:* Looks well, though a few fields have been injured by the chinch-bug. *Perry:* Chinch-bugs very destructive. *De Witt:* Generally winter-killed. *Clinton:* Fly at work. *Boone:* Spring-wheat greatly reduced by chinch-bugs. *Menard:* Winter-wheat badly winter-killed; spring crop injured by drought. *Randolph:* Greatly improved. *Clarke:* Greatly improved by fine weather. *Franklin:* Winter-wheat 20 per cent. injured by chinch-bugs; Fultz wheat doing well, though sown late. *Ogle:* Spring-wheat unpromising. *La Salle:* Promising. *Logan:* But little spring-wheat. *Gallatin:* Prospects better than for several years. *Stephenson:* Looks well. *Wabash:* Fly has cut down the crop one-half. *Saint Clair:* Heading unusually large. *Jersey:* Good on timber lands, but weedy and thin on prairie land. *Edgar:* Promising. *Cass:* Not over half a crop winter-wheat: spring-wheat looks well. *Lawrence:* Chinch-bug and fly have cut down the crop one-half. *Crawford:* Chinch-bugs have done terrible damage. *Putnam:* Badly winter-killed, including Fultz. *Richland:* Fly and chinch have cut down the crop to half an average. *Hancock:* Terrible ravages of fly and chinch.

MICHIGAN.—*Washtenaw:* Wheat doing fine; crop about two-thirds: much old wheat

left over. *Kalamazoo:* Greatly injured. *Mecasta:* Better than for years. *Emmett:* Greatly improved; spring crop acreage reduced. *Lapeer:* Badly winter-killed. *Oakland:* Poorly, late sown last fall; greatly injured by unfavorable winter and spring. *Calhoun:* About average; drilled better than broadcast. *Ottawa:* Stand thin but doing well. *Tuscola:* Winter crop light. *Wayne:* Looks well on sandy soil; spotted on clay land. *Van Buren:* Looks well. *Newaygo:* Nearly average; much benefited by cool, damp weather. *Clinton:* Largely plowed up; not a fourth of a crop. *Sanilac:* Almost a total failure; nine-tenths plowed up. *Shiawassee:* Prospects brighter. *Livingston:* Poor show. *Montcalm:* Badly winter-killed. *Berrien:* Spring rains very beneficial.

Wisconsin.—*Walworth:* Winter-wheat looks well, but the acreage is small and decreasing. *Juneau:* Looks fine; never better. *Fond du Lac:* Harvest four weeks late. *Pierce:* Winter wheat on prairie soil badly winter-killed. *Saint Croix:* Spring crop fine. *Calumet:* Spring acreage small. *Waukesha:* Late snow; spring crop 10 per cent. above average. *Sheboygan:* Spring-wheat looks well. *Grant:* Promising. *Bayfield:* Acreage small, but crop promising.

Minnesota.—*Meeker:* Looks well. *Waterman:* Fine promise; no winter-wheat. *Blue Earth:* Acreage decreased. *Freeborn:* Spring sowing late. *Fillmore:* Looks splendidly. *Nebraska:* Stand excellent. *Jackson:* Looks well. *Steele:* Promising. *Houston:* Unusually good.

Missouri.—*Caldwell:* Almost a failure. *Greene:* Prospect better; probably three-fifths of a crop. *Platte:* Scarcely a good acre. *Barton:* Almost a total failure; no spring-wheat raised. *Harrison:* All winter-wheat, except early sown, a failure; spring-wheat doing well. *Polk:* Almost a total failure, including Fultz, through bad weather and insects. *Buchanan:* Almost a failure; Fultz entirely frozen out. *Newton:* Half winter-killed. *Moniteau:* A failure; chinch bugs in vast numbers. *Crawford:* Fine prospect ruined by chinch bugs. *Boone:* Poorer than for thirty years. *Cole:* Drilled wheat a good stand; broadcast poor. *Putnam:* Looks well; chinch-bugs restrained by the cold. *Holt:* Winter-killed. *Daviess:* Winter-killed. *Stone:* Injured by cold and insects; not over a half crop; *Cass:* Badly winter-killed. *Vernon:* Drilled wheat average; broadcast one-fourth; much of it plowed up. *Montgomery:* Much wheat plowed up. *Carroll:* Spring-wheat splendid; winter crop a failure. *Livingston:* Broadcast a failure. *Taney:* Prospect brightening; almost an average. *Macon:* The best districts a fourth of a crop. *Nodaway:* Winter-wheat ruined. *Saint Louis:* Half a crop. *Benton:* Very unpromising. *Morgan:* Winter-killed; yield less than in twenty years. *Callaway:* Badly winter-killed. *Jasper:* Better than was expected. *Howard:* Good upon dry rich land. *De Kalb:* May make seed. *Shelby:* Winter-killed. *Franklin:* Chinch-bug. *Hickory:* Winter-killed and eaten by chinch-bugs. *Marion:* Chinch-bug. *Barry:* Half winter-killed.

Iowa.—*Cedar:* Growing finely. *Shelby:* Stand excellent, but the rains have made fields on river-bottoms quite weedy. *Audubon:* Prospect good; no winter-wheat raised; too liable to winter killing. *Guthrie:* Frequent light rains have brought out the crop finely. *Buchanan:* Spring-grain growing so fast that it has been pastured to prevent mildew. *Muscatine:* Winter crop injured by drought; spring crop restricted in acreage by wet and by fear of chinch-bugs. *Johnson:* Winter wheat poorer than for years; spring-wheat much better. *Madison:* Winter-killed; not over half a crop. *Chickasaw:* Looks well. *Bremer:* Looks well, but inclines to straw. *Calhoun:* Fultz winter killed; White Australian looks well. *Cherokee:* Season fine for wheat. *Harrison:* Winter crop ruined; spring crop growing too fast. *Tarma:* Spring-wheat looks well. *Buena:* Fultz winter killed. *Mitchell:* Spring-wheat promising. *Lee:* A small white worm, resembling the Hessian fly, has attacked the crop; Australian spring-wheat did well.

Kansas.—*Chase:* Early-sown fields sheltered from the north wind look well, but many others are frozen out; crop but two-tenths of last year notwithstanding an increased acreage. *Douglass:* Winter-wheat a failure; spring-wheat looks well, but acreage small. *Labette:* Winter-wheat improving; spring crop good—the first in the county. *Bourbon:* Chinch taking the remains of the crop. *Johnson:* Mostly frozen out. *Shawnee:* A failure; small area of spring-wheat. *Sedgwick:* Frozen out. *Marshall:* Mostly plowed up for spring crops. *Leavenworth:* Frozen out; chinch taking the remains. *Orange:* Badly winter-killed though drilled in good corn-ground. *Morris:* Almost a failure. *Cherokee:* Many fields are coming out wonderfully in the fine weather. *Nemaha:* Winter-killed; mostly plowed up. *Washington:* Badly winter-killed; spring-wheat largely sown. *Ellsworth:* A failure. *Montgomery:* Drilled wheat looks well; broad-cast winter-killed. *Riley:* Nearly a total loss. *Marion:* Mostly plowed up. *Republican:* Badly winter-killed and plowed up. *Osage:* Winter-killed and eaten by chinches. *Saline:* Almost totally winter-killed.

Nearaska.—*Jefferson:* Very poor, especially the late sown. *Cedar:* Prospects favorable. *Boone:* No winter grain. *Gage:* Winter-killed; spring crop looks well.

Dakota.—*Bon Homme:* Spring-wheat looks very well.

INDIAN TERRITORY.—*Cherokee Nation:* Wheat slowly recovering from the great storm of May 17.

UTAH.—*Box Elder:* Winter crop not a success; largely plowed up. *Weber:* Looks fine. *Cache:* Injured by frosts; spring grain benefited by late rains and is excellent. *Morgan:* Sowing delayed by fear of grasshoppers, which are not one-fourth as numerous as last year. Volunteer wheat will bring 50 per cent. of a crop.

CALIFORNIA.—*Placer:* Acreage increased 10 per cent.; wet winter has reduced the promise of a fine crop. *Sonoma:* Early rains in excess and subsequent drought cut down the crop 40 or 50 per cent. below average. *Sacramento:* Late-sown grain a failure; extensively cut for hay. *San Bernardino:* Rusted by hot winds and sea-fogs. *Humboldt:* Acreage increased. *Stanislaus:* Average 12 bushels per acre; early sown, good; late sown, mostly made into hay. *San Joaquin:* Better than since 1869. *Tuolumne:* Crop light. *Amador:* Distinction between winter and spring grain almost unknown. *El Dorado:* No spring grain.

COTTON.

An increase is reported in the cotton area in every State. A very small proportion of county returns show a decrease of acreage. Planting was generally delayed by a protracted season of drought, and fields that were planted late occasioned some trouble in obtaining perfect stands; but the recent rains, and renewed efforts in replanting, have finally secured stands of average completeness. The percentage of increase in area—last year's crop being the basis of comparison—is as follows: North Carolina, 16 per cent.; South Carolina, 9 per cent.; Georgia, 12 per cent.; Florida, 10 per cent.; Alabama, 11 per cent.; Mississippi, 10 per cent.; Louisiana, 11 per cent.; Texas, 18 per cent.; Arkansas, 16 per cent.; Tennessee, 12 per cent. The average increase throughout the cotton States will approximate 13 per cent. Texas has naturally made the largest relative increase, not only having enjoyed a favorable season for planting, but also during the past year having received accessions of emigrants who are cotton-planters. The condition of the plant throughout the cotton section is very nearly a full average. Separating the Atlantic from the more western States, the former stand a little below an average. The latter are fully up to the standard of a fair condition. The drought which prevailed in April and the first half of May delayed the growth, and the cold nights in the more northern belt had a further retarding effect, but the abundant rains and genial temperature which followed have wonderfully invigorated and advanced the crop. The following figures represent the condition of cotton in the several States, one hundred standing for an average: North Carolina, 96; South Carolina, 92; Georgia, 96; Florida, 95; Alabama, 105; Mississippi, 100; Louisiana, 104; Texas, 100; Arkansas, 98; Tennessee, 101.

Four counties in Virginia report the culture of cotton, viz: York, Southampton, Prince George, and Surry. A small increase of area is shown, and condition a little below average. Virginia is not reckoned a cotton State.

Thirty-five county reports are received from North Carolina, all showing enlarged acreage, except Mecklenburgh, Rowan, Wilkes, Surry, Lenoir, Catawba, and Alamance, which give the same area as last year. Eighteen place condition below 100. The following extracts show local peculiarities:

Northampton: Cotton area increased 10 per cent.; stand good, and prospects as favorable as usual. *Mecklenburgh:* Cotton prospect worse than for ten years. A heavy, beating rain-storm just after planting, followed by dry, baking weather, prevented its coming up. *Chowan:* More cotton planted than ever before; the dry weather kept it back, but late rains have produced a very good stand. *Pitt:* Rains have produced a good stand, in spite of previous drought, but have also brought forward the grass. A larger area planted than last year, and less labor available for its culture. *Camden:*

Cool weather has retarded the growth of cotton; stand poor. *Rowan:* Doing well. *Bladen:* Planting late and hurried; only ordinary stands, on account of the drought at planting. Nights too cool for its rapid growth; dying out to some extent. *Duplin:* Unusual amount of commercial manures used; late starting, but good stands obtained. *Pasquotank:* Area doubled; cool, dry weather has prevented a good stand; crop will probably be short. *Gaston:* Very unpromising. *Sampson:* Cotton-planting late, but stand unusually good; crop looks finely. *Moore:* Cotton planted late, but looks well; stand good. *Perquimans:* Cotton area doubled; stands good; cotton displacing the wheat-crop. *Coahoma:* Earlier planted cotton looks well. *Stanly:* Drought in April and May will shorten the crop. *Montgomery:* The crops three weeks in advance of last year. *Jones:* Prospect never better, but labor scarce.

Every report from South Carolina, except that from Newberry, (which is 100,) increases the area of last year. Fairfield stands highest in condition, at 110; Marlborough and Livingston, 100; and twelve counties reported stand below average.

York: There is an increase of acreage; but six weeks of drought after planting has put the crop back very much. The stand is good, except where it was planted very early. *Anderson:* Has suffered much from drought. Half of what was planted in May is at a poor stand, but it generally looks strong and healthy. Fertilizers have been freely used. *Williamsburgh:* Late in coming up, and the stand not very good, but the growth has been rapid, the tilth good, so that the prospect is favorable, take it altogether. *Orangeburgh:* Looks fine; favorable season. *Fairfield:* Cotton area increased; more fertilizers used; labor less abundant and available; crop retarded by the late spring and lack of rain up to May 16, since when fine rains have produced a great improvement. Stand good. *Union:* In the northern part of the county the stand is good, and the season has been favorable for cultivation, but in the southern part there has been very little rain since April 8, and it is unpromising. *Edgefield:* The stand is imperfect owing to continued drought over much of the county since the early part of April. The indications do not point to a larger crop than last year's. *Richland:* The stand is very imperfect, much not yet up, and much land too hard and dry to break up. *Marlborough:* That planted early in April came up well and is very promising, while late-planted cotton has not yet received the first working, and will require a late fall to make a good crop. *Newberry:* The stand is very poor owing to cool nights and drought during spring. Many crops have been replanted entire, the second crop just coming up; more fertilizers used than last season, and the crop may be an average one, though the prospect is not encouraging.

Very full returns are received from Georgia, numbering sixty-three, and representing as many counties. The only counties in which the cotton area appears to be diminished are Worth, Schley, Troup, Heard, Greene, Pike, Newton, Liberty, and Charlton. Among the principal cotton counties, Pickens claims an increase in area of 30 per cent., Gordon of 25, and Dawson and Coweta of 20, and Hancock of 5 per cent. Thirteen reports claim condition above average from 5 to 25 per cent., among which are Gordon, Schley, Lee, Glynn, Brooks, Walker, Putnam, and Milton.

Stewart: Stands good; bottoms all planted and doing well; promises better than for several years. *Madison:* Stand bad, but condition good. *Glynn:* Three weeks late, but in good condition. *Marion:* Looks well. *Upson:* Increased use of fertilizers, but drought has injured the crop. *Lee:* Twenty per cent. of cotton crop not up; planted late on account of drought. *Greene:* Stand small and late. *Troup:* Poor cotton stand; plants sickly. *Heard:* Bad stand. *Clayton:* Cotton mania raging; 200 tons of fertilizers bought on credit; crops mortgaged for provisions. *Chattooga:* Unusually good stand. *Laurens:* Drought has greatly injured the prospect. *McDuffie:* Favorable weather, and guano are pushing the crop. *Gwinnett:* Late rains have improved cotton. Immense quantities of commercial manures used. *Johnson:* Acreage devoted to cotton increased 10 per cent., but drought prevented the planting of the whole. *Twiggs:* Very backward, but good stands secured. *Richmond:* In better condition than usual. *Fulton:* Drought has caused much cotton to be plowed up. *Sumter:* Bad stands. *Butts:* Drought in May made poor stands *Muscogee:* Doing well where there is a stand. *Walton:* Season unfavorable. *Harris:* Dry weather of May prevented the cotton from coming up well. *Columbia:* Bad stand; weather and seed complained of; a good, warm rain may yet bring it out. *Newton:* Stand pretty good, but plants small. *Putnam:* Stand first-rate, but a full month late. *Oglethorpe:* A tolerable stand, and late, but improving. *Fayette:* Stands good. *Chattahoochie:* Prospect average; better than last year. *Wilkinson:* Stands poor; in some

cases few or no plants are up. *Forsyth:* Generally a fine stand, but late; caused by drought. *Hancock:* Late planting, but stands good; condition good, but backward. *Wilkes:* Stands unsatisfactory; alleged causes: 1st, defective seed; 2d, drought from May 5 to 20; 3d, casualties after the plant is up. Late planting decidedly the best. *Cobb:* Late rains have improved cotton. *Douglass:* Stand short, through drought.

Only two counties in Florida return a decrease of area, but there is much variation in the reports of condition.

Jackson: Three weeks behind in sowing, but generally clean and looking well. *Liberty:* Cotton-seed on rolling land considerably washed out; on level land greatly rotted. The seed had been considerably heated after gathering, destroying its germinating principle. The crop will be 25 per cent. short. *Leon:* Increase of cotton area due to negroes putting their patches in cotton instead of corn. *Hamilton:* Doing well; stands drought better than other crops. *Bradford:* Looks well; promises more than an average crop. *Orange:* Stand poor. *Suwance:* Late, wet, and cold spring makes the cotton crop backward; cut-worms injuring the late plantings. *Levy:* Early cotton doing well; late cotton ruined. *Wakulla:* Prospects better than usual.

Bibb and Jefferson are the only counties in Alabama which return a diminished acreage; ten report the same as last year, and the remainder make an increase ranging from 5 to 25 per cent. About one-third of the reports indicate condition below average, and the remainder are nearly equally divided between high condition and an average.

Montgomery: Late in coming up. Crops small but clean, and looking well; acreage reduced and condition inferior to last year. *Franklin:* Late hot weather favorable to cotton; no insects infesting it. *Marshall:* Early planted above average. *Tuscaloosa:* Looks unusually well. *Autauga:* Looks well; cleaned by the drought of grass and weeds. *Conecuh:* Area somewhat larger than last year. Early planted cotton looks well. *Lawrence:* Late but promising. *Colbert:* Heavy stand, growing fast; much of it, late planted, will be in danger from late frosts. *Greene:* Season dry, but favorable to cotton, especially on low bottoms. *Cherokee:* Suffering from excessive moisture; stand good, but the growth is injured by insects, especially the flea-bug. *Sumter:* Drought has retarded cotton growth. *Clarke:* Late in coming up. *Dallas:* Promises an abundant yield. *Morgan:* A good stand in spite of drought; it looks healthly and promising. *Clay:* Complaints of bad stands. *Randolph:* Recent rains have improved cotton. *Crenshaw:* Imperfect stand. *Lauderdale:* Growing well.

Notwithstanding the delay and apparent injury from drought in April and May in Mississippi, reports of condition are comparatively favorable, the average standing at 100. A large proportion of the counties claim increase of area, the total increase being 10 per cent.

Winston: Came up badly until after the rain of May 21; very late, but looking finely. *Smith:* Looks promising, except on low bottom-lands, where heavy rains the latter part of May injured it much. First forms seen May 20. *Bolivar:* Very late. Little came up till after May 23, and, unless the fall is very favorable, the crop will be short. *Grenada:* The severe drought caused a bad stand; but rains have improved the appearance. *Kemper:* Early cotton looks well, but some is not yet planted, and the stand is generally not good. *Noxubee:* Excellent condition; stand good. *Newton:* Doing very well, the short drought allowing planters to get it clean; stand good; late favorable rains. *Wayne:* Drought helped cotton by giving opportunity to clean it. *Warren:* Imperfect stand of cotton from drought. *Pike:* Drought has injured cotton. *Amite:* Late cotton injured by drought; but a good crop is expected. *Lowndes:* Doing well. *La Fayette:* Late, but a good stand, and looks well. *Holmes:* Very late and small, and the stand bad, owing to unprecedented dry spell in April and May; much of the cotton did not come up till after May 25. *Yazoo:* Two weeks later than last year, owing to drought in April and May, but rains general since and crops improving rapidly. *Neshoba:* Condition below that of last year, owing to the dry spring. *Rankin:* Has improved wonderfully since the middle of May. *De Soto:* Doing well. *Jefferson:* Looking well, but complaints of bad stand from early drought of one month. *Yalabusha:* Healthy and in fine condition; considerable complaint of bad stands.

Returns are received from twenty-one parishes in Louisiana, of which only West Feliciana, Saint Helena, and Franklin report decrease of area. The center of cotton-growing in the State, Tensas Parish, reports an increase of 10 per cent. in area, and condition 20 and above average.

Union: In better condition than at the same time any year since 1865. *East Feliciana:* Quite up to average; blossoms reported near the Mississippi as early as May 28. *Morehouse:* Several weeks later than usual, but looks well, though it has been injured by heavy rains for several days past. *West Feliciana:* Early cotton generally looking well, though somewhat injured by lice, and the stand not good. That planted late coming up badly. Cotton-caterpillar reported in small numbers on several plantations. *Richland:* Stand good, but condition rather below average. *Ouachita:* In fine condition, good stands, well worked. *Madison:* Good stand, and nearly worked over first time. *East Baton Rouge:* Three weeks later than usual, but in good condition. *Carroll:* Fine condition; better than last year.

Nearly all the Texas returns indicate enlarged area, and the average increase is placed at 18 per cent. The season has generally been favorable for planting and for the growth of the plant. The prospect for an average crop is good.

Henderson: Cotton looks well in spite of the late season, showing considerable improvement in culture. *McLennan:* Cotton very good. *Milan:* Best cotton prospect for many years. *Upshur:* Increased cotton acreage; condition inferior, on account of cool weather. *Titus:* Cotton mania raging. *Matagorda:* Cotton-worms reported. *Lavaca:* Cotton stands excellent, especially where early planted.

The returns from Arkansas indicate very nearly an average condition of cotton.

Marion: Ten times the area of last year. *Jackson:* Generally in grass, and being hoed and plowed so wet as to cause injury, it is feared. Hoe hands ask $2 per day. Increase of 25 per cent. in acreage. *Independence:* Increase of 20 per cent. in area, but heavy rains have interfered with cultivation. *Crittenden:* Looks indifferent. The seed lay in the ground five weeks, owing to drought. *Columbia:* Generally came up well, but the stand was slightly injured by the recent heavy rains; 20 per cent. increase in acreage. *Pulaski:* Damaged very much by continuous rains; poor stand. *Woodruff:* Came up late and irregularly; cut-worms bad; labor scarce, owing to the building of railroads in the vicinity. Some land lying idle.

The Tennessee returns indicate excellent condition and increase of area.

Giles: People cotton-crazy; planting an unusual quantity—a suicidal policy for Middle Tennessee—and neglecting grains and grasses. *Fayette:* Crop backward; retarded by backward spring. No planter has yet secured a stand. Seed not injured in the ground, and rain will bring it out. *Wayne:* Good condition, and larger area than usual. *Wilson:* Large increase in acreage; condition good. *Lauderdale:* Stand poor and small from drought.

CORN.

The area of corn is not included in the June circular, the planting in many States not being finished. The returns made are therefore voluntary. The information received shows that planting has been late and cut-worms unusually prevalent. A full report of area and condition will be given in the July number.

NEW YORK.—*Livingston:* Corn planted in good order and season. *Fulton:* Very backward. *Ontario:* Coming up yellow.

NEW JERSEY.—*Hudson:* Promises well.

PENNSYLVANIA.—*Greene:* Coming up badly. *Susquehanna:* Yellow and backward. *York:* Late rains have made corn promising. *Centre:* Not growing fast. *Beaver:* Cold May made corn yellow and backward. *Indiana:* Coming up very irregularly; cut-worms taking it rapidly. *Lebanon:* Coming up well. *Lawrence:* Not doing well.

MARYLAND.—*Baltimore:* Cut-worms and ants injuring the corn. *Cecil:* Generally late planted, and did not come up well. *Kent:* Has not suffered much from the drought. *Washington:* Doing well, owing to recent rains. *Charles:* Bad stand now, but not too late for remedy from replanting.

VIRGINIA.—*Spottsylvania:* Late planted. *Henrico:* Area increased one-third; coming up badly. *Surrey:* Has come up badly, and is troubled with bud-worms. *Richmond:* Drought has badly injured corn. *King and Queen:* Did not come up, owing to drought. *Highland:* Comes up poorly, and is devoured largely by cut-worms. *Rappahannock:* Stands very badly; many replanting; cut-worm at work; drought keeps the corn from recovering from its ravages. *Bath:* Cut-worms cut down the corn as fast as it comes up. *Mecklenburgh:* Heavy rains at corn-planting, followed by baking sunshine

and high winds, formed a hard crust, which was difficult for the corn to break through. *Fairfax:* Coming up badly. *Augusta:* Came up poorly; where shallow-planted not at all. *Prince William:* Cannot sprout without rain. *Henry:* Well worked; looks well. *King George:* Bud-worm destroying corn.

North Carolina.—*Northampton:* Area about as usual; crop looks well. *Randolph:* Hopeful. *Chowan:* Looks well. *Camden:* Doing well, but the stand is below average. *Bladen:* Clean and looking well. *Sampson:* Late but good. *Perquimans:* Looks well, and in good order. *Coahoma:* Crop good. *Stanley:* Injured by drought, and cut down by a black worm of the size of the *Pyralis*, which infests the grape-vine; some farmers have got but a third of a stand on the third planting. *Jones:* Prospect never better.

South Carolina.—*Richland:* The stand poor; much not yet up. *Williamsburgh:* Fair prospect. *Orangeburgh:* Favorable season; looks fine.

Georgia.—*Glasscock:* Looks badly, and farmers anxious about it. *Chattahoochee:* Average prospect; better than last year. *Forsyth:* Fair, but uneven; the bud-worm prevented an early stand. *Twiggs:* Small, but healthy. *Stewart:* Good. *Madison:* Stand bad, but condition good. *Decatur:* Suffering greatly from drought.

Florida.—*Jackson:* Neglected; three weeks behind in planting. *Bradford:* Suffering somewhat. *Manatee:* Yellow field-corn from the Department looks well in spite of drought; it is two weeks earlier than native corn. *Levy:* Nearly ruined; an immediate rain may make half a crop. *Wakulla:* Drought damaging; not one-half a crop will be gathered.

Alabama.—*Marshall:* Early corn looks well. *Tuscaloosa:* Crop fine. *Autauga:* Late, but looking well. *Conecuh:* Looking badly, but improved by late rains. *Macon:* Full average. *Lawrence:* Late, but promising. *Colbert:* Early corn promising; late-planted poor. *Greene:* Late fine rains have improved the corn. *Cherokee:* Two late heavy rains have greatly improved the corn. *Dallas:* Area increased 10 per cent.; crop promising. *Randolph:* Corn-stand imperfect, but improved by recent rains. *Crenshaw:* Pennsylvania yellow corn from the Department looks well. *Lauderdale:* Clean and healthy.

Mississippi.—*Newton:* Very good. *Wayne:* Rather benefited by the drought, in giving a chance to clean it. *Warren:* Increased acreage; looking as well as could be expected. *Pike:* In fine condition, owing to dry weather. Pennsylvania corn threatens to be a failure. *Amite:* Good crop expected. *Hinds:* Above an average. It is the crop we should be most interested in. *Lowndes:* Doing well. *Holmes:* Bad stand; stunted and small; much of it too much so to recuperate. *Yazoo:* Two weeks later than last year, owing to drought in April and May, but rains have since been general, and crops have improved rapidly. *Rankin:* Has improved wonderfully since the middle of May. *De Soto:* Doing well. *Jefferson;* Promising better than last year. *Winston:* Looks finely. *Smith:* Pennsylvania corn, from the Department, in silk May 20; other corn waist-high. *Bolivar;* Very late; not much came up till after May 23. *Grenada:* Has kept a good color, but the stand is bad. *Kemper:* Looks promising. *Noxubee:* Fine in spite of drought.

Louisiana.—*East Feliciana;* Unusually promising; season favorable. *Bossier:* The yellow prolific corn, planted March 15, is now in tassel, and can be laid by in time to work cotton. *Morehouse:* Several weeks later than usual, but looks well. *Richland:* Acreage increased and stand good, after a second planting, in many places. *Ouachita:* Good stand, and in fine condition. *East Baton Rouge:* Ten per cent. increase in acreage, and condition good. *Carroll:* Has suffered severely from the attacks of a very small bug. Some farmers have replowed more than once.

Texas.—*Henderson:* Looks well; better cultivated than formerly. *Cherokee:* Crop backward. *McLennan:* Crop estimated at 40 to 60 bushels per acre. *Milam:* The best prospect for corn for many years. *Kendall:* Pennsylvania corn, from the Department, on the 26th of May had distinctly formed ears. *Lavacca:* Roasting-ears for two weeks, from the Pennsylvania corn sent by the Department.

Arkansas.—*Newton:* Below average condition, owing to wet spring. *Independence:* Cultivation greatly interfered with by heavy rains. *Columbia:* Looks remarkably well, though a little later than usual.

Tennessee.—*Roane:* Difficult to get a stand, on account of cut-worm. *Knox:* Many fields have been plowed up and replanted, owing to ravages of cut-worm caused by the cool weather; otherwise the crop is doing well. *Wayne:* Condition good. *Loudon:* Very promising. *Sullivan:* Cut-worms have been very destructive, and we are still replanting. If the season is favorable, we will yet make a crop.

Kentucky.—*Russell:* Ground baked hard; much of the corn planted has been replanted. Crop prospects very poor. *Daviess:* Backward, and much trouble with cut-worms. *Henry:* Good stand secured; young plants thrifty.

West Virginia.—*Marion:* Cut-worms very bad, cutting off some fields while disturbing others very little. *Raleigh:* Late planted, owing to drought. *Jefferson:* Has come up indifferently. *Braxton:* Very backward. *Cabell:* Cut-worms destructive. *Upshur:* Early plantings rotted.

OHIO.—*Noble:* Cut-worms bad on sod-ground corn. *Warren:* Large winter-wheat area plowed up for corn. The cut-worm has appeared in the corn-field. *Greene:* Corn making a good start. *Hancock:* Cut-worms destroying whole corn-fields. *Henry:* Corn was planted early and has come up well, but is badly injured by cut-worms. *Lucas:* Cut-worm very destructive. *Lorain:* Cut-worm making sad havoc with new planted corn. *Adams:* Crop doing poorly; cut-worms. *Champaign:* Cut-worms very destructive.

INDIANA.—*Decatur:* Coming up well; planted late on account of cut-worms. *Grant:* Injured seriously by cut-worms. Crop prospects poor. *Madison:* Cut-worms very destructive, delaying the planting on stubble and sod lands. *Perry:* But half planted. *Johnson:* Cut-worms have destroyed the first planting of many corn-fields. *Boone:* All corn on sod and stubble ground destroyed by cut-worms. *Fayette:* Acreage increased 25 per cent.; condition about 80 per cent.; cut-worms bad. *Noble:* Cold weather made late planting. *Wayne:* Worms and insects destroying the crop. *Howard:* Cut-worms have been very destructive. *Owen:* Good condition except for the recent washing rains. *Marshall:* Late, and cut-worms bad. *Hamilton:* Cut-worm worse than ever before, keeping corn back very much. *Hancock:* Many pieces of early corn destroyed by the black cut-worm. *Whitley:* Some complaints of cut-worms. *Wells:* Sod-ground corn destroyed by cut-worms. *Franklin:* Much complaint of cut-worms. Much replanting will be done. Ground in good order. *Cass:* Cut-worms worse than ever before. Many fields replanted entire.

ILLINOIS.—*Gallatin:* In the finest condition, promising a very large crop. *Livingston:* Backward, but coming up. *Iroquois:* Planted earlier than usual; cut-worms prevalent in soddy land. *Stevenson:* Planting delayed by wet; crop will probably be short. *Wabash:* Mostly planted, but in general it is not doing well. The cut-worm is injuring it, and the army-worm has appeared in immense numbers in some localities. *Richland:* Planting delayed by wet season. *Saint Clair:* Looks well. *Winnebago:* Slow in growing. *Crawford:* Chinch-bugs threatening. *Putnam:* Looks sickly. *Pike:* Wire-worm destroying many corn-fields. *Lee:* Planting late; earlier plantings had to be renewed; prospects gloomy. *Tazewell:* Injured by cut-worms; the best stand for many years. *Boone:* Planting very late. *Grundy:* Fair stand but slow growth. *Fayette:* Crop looks fair.

MICHIGAN.—*Bay:* Rains rather copious for corn. *Washtenaw:* Weather fine for corn. *Van Buren:* Looks well. *Cass:* Backward. *Shiawassee:* Too cold.

WISCONSIN.—*Walworth:* Acreage increasing. *Richland:* Planting delayed; in some early plantings the seed rotted. *Fond-du-lac:* Looks sickly. *Clark:* Below average; much seed rotted. *Portage:* Weather too cold. *Columbia:* Not looking well. *Adams:* Planting late. *Saint Croix:* Too wet. *Grant:* Late, but presenting a good stand.

MINNESOTA.—*Steele:* Backward. *Freeborn:* Planting late; in some cases the seed rotted in the ground. *Houston:* Very backward.

IOWA.—*Clinton:* Planting two weeks late; not all planted by the 23d of May; very little up; looks bad. *Cedar:* Planting succeeded well. *Guthrie:* Looking well after the light and frequent rains. *Audubon:* Sickly. *Hardie:* Backward. *Howard:* Unpromising. *Madison:* Not coming up well; weather too wet and cold. *Pottawattomie:* Planting delayed by rain. *Winnisheik:* Late planted, and considerably rotted by wet. *Cherokee:* Backward. *Carroll:* Backward. *Jasper:* Five per cent. replanted. *Decatur:* Poor and backward.

MISSOURI.—*Platte:* Ravaged by the grub-worm. *Moniteau:* Planting delayed a month by wet weather. *Clinton:* Looks poor. *Daviess:* But little planted yet. *Pike:* Chinch threatening. *Pulaski:* Rain damaging the crop. *Saint Louis:* Chinch-bugs damaging the crop. *Benton:* Chinch-bugs at work. *Jasper:* Late, but growing fast. *DeKalb:* Area increased. *Perry:* Cut-worms and chinch-bugs. *Marion:* Planting late.

KANSAS.—*Douglas:* Late and just coming up; much ground not yet planted. *Bourbon:* Planting late. *Leavenworth:* Large area still unplanted.

NEBRASKA.—*Hall:* Kept back by cool nights; Deep plantings have rotted.

INDIAN TERRITORY.—*Cherokee Nation:* Great storm of May 17 necessitates a replanting.

OATS.

An increase in the area in oats is given in nearly all the States. The only diminution reported is in Massachusetts, Rhode Island, Connecticut, New Jersey, Maryland, Virginia, North Carolina, Kentucky, and California, varying 86 to 99 per cent. Condition is reported high in every Western State beyond Ohio, in the Southwestern States, and in the northern portion of New England. Notwithstanding the unpromising appearance in the Atlantic States, south of Massachusetts, an increased product may be expected.

VERMONT.—*Orange:* Oats increased in acreage and improved in appearance. *Orleans:* Look well.

NEW YORK.—*Livingston:* Sown in good order and season. *Genesee:* Need rain. *Wyoming:* Small. *Otsego:* Promising. *Rensselaer:* Beginning to grow finely.

NEW JERSEY.—*Camden:* Light on the ground.

PENNSYLVANIA.—*Bucks:* Probably short. *Greene:* Healthy but short. *Lancaster:* Short, but well set; with good weather will make an average crop. *York:* Look promising, on account of late rains. *Centre:* At a stand-still. *Indiana:* Making poor progress.

MARYLAND.—*Frederick:* Almost a total failure. *Howard:* Spring drought prevented the oat-straw from forming fully; both straw and grain will be light. *Queen Anne:* Late sown and short; will make but a poor crop. *Cecil:* Very unpromising. *Kent:* Dried up. *Washington:* Doing well, owing to recent rains.

VIRGINIA.—*Culpeper:* Look badly; without great improvement in the conditions of growth they will not make half a crop. Schonen 90 per cent. of average. *Spottsylvania:* Average sowing a month late; prospects of a poor crop. *Henrico:* A serious failure, especially winter-oats. *Botetourt:* Injured by drought, fly, and joint-worm. *Stratford:* Severely affected by drought. *Giles:* Poor. *Surry:* Acreage slightly decreased and 25 per cent. inferior in quality. *Fluvanna:* Rain has greatly improved the crop but it will be short. *King and Queen:* In a very bad condition. *Orange:* Very short. *Madison:* Very unpromising. *New Kent:* Fall-oats, on thin lands, died out; those on good land will make three-fourths of a crop. Spring-oats, though suffering for rain, look well and will make an average crop. Fall-sown Schonen oats will scarcely make seed; spring-sown Schonen oats will be 50 per cent. better than any others. *Prince George:* Crop suffered from drought. *Bath:* Very short. *Amherst:* Injured seriously by drought. *Nelson:* Exceedingly short. *Fairfax:* Abundant rains may bring up oats to three-fourths of a crop. *Augusta:* Very short. *Prince Edward:* Backward. *Clarke:* Crop worse than for years. *Prince William:* Suffering from lack of rain. *King George:* Sown late, head low, and are very unpromising. White Schonen and Excelsior the best. *Wise:* Much injured by drought.

NORTH CAROLINA.—*Northampton:* Late, on account of drought, but promise to be as good as usual *Randolph:* Promising. *Mecklenburgh:* Injured by drought. *Chowan:* Good, *Rowan:* Stunted by drought, but may be redeemed by favorable weather. *Bladen:* Nearly all killed out. *Gaston:* Badly winter-killed. *Franklin:* Greatly improved by late rains. *Moore:* Greatly injured by drought, but improved by late rains. *Perquimans:* Fall sown better than last year. *Alamance:* Improving, but will not make a good crop. *Haywood:* Injured by drought. *Henderson:* Improving. *Stanley:* Injured by drought. *Montgomery:* Increased acreage and better than average condition.

SOUTH CAROLINA.—*Union*: Fall-sown oats on good clean land, good; spring-sown, very unpromising; harvest has commenced. *Edgefield:* The crop very short from drought; that sown early in cotton land will yield 25 to 30 bushels; late-sown, 3 to 15 bushels; harvest commenced. *Chesterfield:* The red rust-proof oats, introduced from Georgia are the favorite; have been harvested, while the common oats are just heading out. The Schonen oats I sowed were killed by the winter. *Richland:* When sowed in the early fall the yield has been good, but spring-oats are a perfect failure, except in bottom-lands, owing to drought. The rust-proof variety has been universally used. *Darlington:* Considerably injured by a drought of eight weeks in April and May. *Orangeburgh:* Season too dry.

GEORGIA.—*Muscogee:* Heading low, on account of dry weather *Gordon:* An unprecedented amount of chess or cockle among fall or winter oats. *Murray:* Full average crop. *Glascock:* Very poor; especially spring-oats. *Oglethorpe:* Improving. *Fayette:* Injured by drought. *Forsyth:* Doing well, but low on the ground. *Cobb:* Backward. *Chattooga:* Improving. *McDuffie:* Improving. *Wilkes:* Rains rather too late for spring-oats. *Marion:* Schonen oats sown in November vegetated well but were half killed by winter; the balance rusted. *Upson:* Drought shortened the oats. *Butts:* Shortened by drought in May. *Madison:* Not much sown; spring-oats almost a failure: fall-oats good. *Decatur:* Much damaged.

FLORIDA.—*Jacksonville:* A failure; affording limited pasturage. *Wakulla:* Injured by drought.

ALABAMA.—*Lowndes:* Drought injured the oats. *Blount:* Weather unfavorable. *Conecuh:* Acreage increasing. *Greene:* Drought has materially injured oats. *Sumter:* Culture increasing. *Clark:* Norway oats will not do; the only successful variety is called the non-rusting oats. *Clay:* Drought disastrous; crop too late to cut. *Calhoun:* Oats a little shortened by dry weather. *Lauderdale:* Growing well.

MISSISSIPPI.—*Lee:* Promises an extraordinary yield; Excelsior ahead of all others. *Wayne:* Injured by drought. *Neshoba:* Condition below that of the same date last year, owing to spring drought. *Rankin:* The red oats, generally raised here, proves a valuable variety, and is the only kind which escapes rust; wherever sown late in the fall it has a good growth, and looks promising, but the spring-sown oats look indifferently. *De Soto:* Doing well. *Winston:* Very sorry condition; headed out at a

foot from the ground; unless the late rains cause increased growth they can not be cut; many farmers will have to graze their fields. *Kemper:* Increased area of oats and other small grains. *Noxubee:* Fall-sown tolerably good, but spring-oats nearly a failure; drought has injured the crop much, but the late rains may improve it.

LOUISIANA.—*Morehouse:* Spring oats look well.

TEXAS.—*Gonzales:* Oat-culture a valuable acquisition and increasing; "anti-rust" oats preferred. *McLennan:* Will yield from 40 to 60 bushels per acre. *Upshur:* Acreage doubled; crop prospects fair; rust-proof oats introduced. *Fayette:* Crop 200 per cent. better than any crop within ten years previous. *Galveston:* Badly rusted.

ARKANSAS—*Independence:* Excelsior very promising.

TENNESSEE.—*Campbell:* Winter-oats killed by cold; Chowan oats sown in the spring are doing well. *Rhea:* Injured by drought, but doing better since the late rains. *Grainger:* Drought injured them, but the condition has been improved by recent rains. *Robertson:* Short, owing to dry weather. *Knox:* Owing to the drought the crop will be short; the "White Schonen" looks better than other kinds. *Wayne:* Condition good. *Monroe:* Cut short by drought. *Jefferson:* Schonen shortened by drought. *Weakley:* The crop was abandoned some years ago on account of rust, but it seems to be free from it now, and the area is extending. *Sevier:* Cut short by severe drought. *Wilson:* Heading out and promise well, though the dry weather affected the growth; area unusually large.

KENTUCKY.—*Nicholas:* Injured by heavy rains early in the spring, followed by drought. *Owsley:* Crop very deficient. *Laurel:* Look well, but not equal to last year. *Butler:* Injured. *Meade:* Not sown till April 15. *Russell:* Parched out by drought. *Adair:* Seasonable weather will repair the injury of the dry spring.

WEST VIRGINIA.—*Hardy:* Not over a half crop. *Preston:* Injured by severe drought. *Braxton:* Short and bad. *Kanawha:* Late sown and unpromising. *Jefferson:* Very backward. White Schonen becoming common and are doing better than other varieties. *Harrison:* Not half a crop.

OHIO.—*Scioto:* Look exceedingly well. *Hardin:* On sod ground much injured by cut-worms. *Defiance:* Retarded by fall and spring drought. *Pickaway:* Will be short. *Hancock:* Cut-worms destroying whole fields. *Allen:* Hard winter and dry spring have played havoc. *Auglaize:* Damaged by cut-worms.

INDIANA.—*Grant:* Will be greatly shortened by cut-worms. *Elkhart:* Look first rate. *Perry:* Not so promising as last year, but will probably be a full average. *Washington:* Good. *Scott:* Late sown Birlie oats look well. *Noble:* Look well. *Wayne:* Worms and insects destructive. *Adams:* Some fields entirely destroyed by a worm called "cut-worm," or "army worm."

ILLINOIS.—*Gallatin:* Promise an extraordinary yield. *Saint Clair:* Look well. *Edgar:* Promising. *Cass:* Never better. *Lawrence:* Doing very well. *Crawford:* Chinch-bug threatening the crop. *Clark:* Look well. *La Salle:* Promising. *Marshall:* Acreage increased. *Lee:* Good prospect.

MICHIGAN.—*Tuscola:* Look well. *Washtenaw:* Good prospect. *Emmett:* Increased acreage. *Van Buren:* Look well.

WISCONSIN.—*Walworth:* Acreage increasing. Look splendidly; never better. *Saint Croix:* Remarkably fine. *Calumet:* Increased acreage. *Sheboygan:* Look well.

MINNESOTA.—*Meeker:* Look well. *Waterman:* Promise an extra crop. *Freeborn:* Look sickly.

IOWA.—*Cedar:* Growing finely. *Jackson:* Fair. *Hardin:* Look fine. *Johnson:* Better than usual. *Muscatine:* Never better.

MISSOURI.—*Platte:* Grub seriously injuring the oats. *Harrison:* Look well. *Buchanan:* Prospect never better. *Moniteau:* Unusually promising. *Daviess:* Not over half the crop sown yet. *Montgomery:* Chinch-bug has appeared among the oats, but has, as yet, done but little damage. *Carroll:* Chinch-bug depredating on oats. *Jasper:* Never more promising. *Franklin:* Large promise. *Dallas:* Chinch-bug threatens the crop. *Marion:* Look well.

KANSAS.—*Cherokee:* Favorable spring. *Leavenworth:* Chinch-bug destructive. *Cloud:* Crop heavy.

INDIAN TERRITORY.—*Cherokee Nation:* Slowly recovering from the storm of May 17.

DAKOTA.—*Bonhomme:* Look remarkably well; ground in fine condition.

RYE.

The acreage of winter-rye is reported above average in the following States, viz: Massachusetts, 102; Florida, 122; Texas, 105; Arkansas, 109; Tennessee, 101; Kentucky, 102; Nebraska, 117; California, 115. It is full average in Connecticut, New Jersey, South Carolina, Wisconsin, and Kansas. In the remaining States the acreage is below average, ranging from 88 in Rhode Island to 99 in Maine and Iowa. In condi-

tion of the crop the following States are average or above, viz: Alabama, 113; Georgia, 109; California and Texas, 108; Tennessee and Kentucky, 105; Arkansas, 102; Vermont, North Carolina, and Minnesota, 100. The remaining States are below average, ranging from 55 in Delaware to 99 in Wisconsin.

VERMONT.—*Orange:* Winter-rye looks well.

MASSACHUSETTS.—*Suffolk:* Suffered severely. *Norfolk:* Somewhat winter-killed but looks well.

CONNECTICUT.—*New London:* Injured by severe winter.

NEW YORK.—*Albany:* Winter-killed and spotted; not over 60 per cent. of a crop. *Jefferson:* Acreage small; looks well.

NEW JERSEY.—*Mercer:* Hardly more than half a crop.

PENNSYLVANIA.—*Lancaster:* As good as ever; straw long and prospects of a large crop flattering. *Montgomery:* Badly winter-killed. *Indiana:* Poor prospect. *Northumberland:* Winter-killed.

VIRGINIA.—*Culpeper:* Scottish seed from the Department, 10 per cent. above average. *Henrico:* Injured by drought. *Craig:* Below average. *Surrey:* Acreage increased 10 per cent.; prospect poor. *King and Queen:* Bad condition. *Bath:* Looks badly.

NORTH CAROLINA.—*Jackson:* Scotch rye promises more grain and less straw than common rye. *Moore:* Rye looks well. *Henderson:* Acreage reduced.

GEORGIA.—*Marion:* Good Scotch rye improved; 3 feet high; lower than native rye.

TEXAS.—*Upshur:* Acreage increased; condition improved. *McLennan:* Will average 25 or 30 bushels per acre.

ARKANSAS.—Scotch rye did not germinate.

TENNESSEE.—*Rhea:* Promising a good crop. *Roane:* Seed from Department very promising.

KENTUCKY.—*Grant:* Largely winter-killed. *Laurel:* More promising than for many years.

WEST VIRGINIA.—*Hardy:* Not over half a crop.

OHIO.—*Scioto:* Acreage reduced 20 per cent.; condition improved 15 per cent., owing to good weather. *Crawford:* Early drilled looks well.

ILLINOIS.—*Cass:* Looks well. *Boone:* Acreage reduced on account of fall drought. *Lee:* Looks well. *Ogle:* Looked poorly in early spring, but has improved.

IOWA.—*Muscatine:* Injured by winter drought.

MINNESOTA.—*Dakota:* Complete failure. *Sherburne:* Badly winter-killed.

BARLEY.

In New England no winter barley is reported. In New York the acreage is 90, and the condition 80. Pennsylvania is 2 per cent. above average in area, and 25 per cent. below in condition. Maryland, with an acreage indicated by 103, reports a condition of only 55. North Carolina is 5 per cent. above average in area and 1 per cent. below in condition. South Carolina is average in both, and Georgia nearly so—99. Alabama, with a reduction of 3 per cent., acreage reports an improved condition of 113. Texas has cut down her area 17 per cent., but the condition is 25 per cent. above average. The figures of Tennessee are 93 and 107 respectively. Kentucky is full average in condition, but 10 per cent. below in area. Of the States north of the Ohio all are below average in condition, ranging from 69 in Ohio to 99 in Wisconsin. Michigan, Illinois, and Wisconsin are average or above in area. West of the Mississippi, Iowa and Kansas present an increased acreage, Iowa 2 per cent. above, Missouri being 80 and Kansas 96. On the Pacific coast, California has increased her area 22 per cent., the condition of the crop being 2 per cent. below average. Oregon is 17 per cent. below average in condition, and 16 per cent. below in area.

Spring barley, in condition, is full average or above in all of the New England States except Massachusetts, where it is 2 per cent. below, the acreage being about average on the whole. In New York and Pennsylvania the acreage is 5 per cent. and the condition from 9 to 12 per cent. below average. In the Northwestern and Pacific States the condition is mostly average or above, ranging from 95 in Ohio to 113 in California. The acreage ranges from 92 in Ohio to 124 in Oregon.

VERMONT.—*Orleans:* Not all sown yet; what was put in from May 1 to 10 looks well.

NEW YORK.—*Livingston:* Some in good order and season. *Genesee:* Unpromising; needs rain. *Wyoming:* Small.

ALABAMA.—*Lawrence:* Unusually promising.

TEXAS.—*McLennan:* Will average 50 bushels per acre.

OHIO.—*Sciota:* Acreage above average. *Warren:* Suffering terribly; spring barley abandoned. *Fairfield:* Badly frozen out. *Crawford:* Early-drilled barley looking well. *Lorain:* Crops never better. *Champaign:* A total failure.

INDIANA.—*Posey:* Harvest two weeks late; army-worm injurious, but the prospect better than last year. *Stark:* Spring barley from the Department very fine.

ILLINOIS.—*Monroe:* Half winter-killed. *Ogle:* Late, but promising. *La Salle:* Spring crops looks well.

IOWA.—*Muscatine:* Never looked better. *Johnson:* Good.

MINNESOTA.—*Meeker:* Looks well. *Waterman:* Doing finely. *Blue Earth:* Slight decrease in acreage. *Freeborn:* Cold, wet weather makes the crops sickly.

UTAH.—*Tooele:* Spring crop short in the straw; farmers discouraged in the culture.

CALIFORNIA.—*Placer:* Considerably drowned out by excessive rains. *Sonoma:* Crop will be but 50 or 60 per cent. on an average; injured by heavy rains in the early part of the season and by subsequent droughts.

GRASS AND PASTURES.

MAINE.—*York:* Grass in both fields and pastures thin and poor. *Aroostook:* Grass-wintered well, and promises a good crop. *Sagadahoc:* Grass growing nicely. *Androscoggin:* Clover almost a failure owing to dry season; pastures fair. *Cumberland:* Considerably winter-killed, but where there is a stand it looks well. *Waldo:* Good prospect for hay. *Somerset:* Grass-fields look poor. *Oxford:* Very favorable winter and spring for hay and pastures. A large crop hardly possible after the drought of last summer, but the prospect very good. *Piscataquis:* Pastures looking much better than for several years; clover has been so much winter-killed that little is now sown.

NEW HAMPSHIRE.—*Rockingham:* Grasses and pastures considerably winter-killed; oats, millet, and corn being sown for fodder. *Hillsborough:* Pastures afford but little food; hay selling at $10 per ton; latest season for many years: much grass winter-killed.

VERMONT.—*Orange:* Pastures look finely; fine rains have given feed two weeks earlier than last year. *Grand Isle:* Clover somewhat winter-killed. *Addison:* Pastures and meadows never better. *Caledonia:* Grass looks well. *Chittenden:* Grass and pastures never looked better. *Essex:* Last half of May especially favorable for grass.

MASSACHUSETTS.—*Worcester:* Pastures badly winter-killed. *Franklin:* Poor prospect for hay. *Plymouth:* Cold, dry winter injured grass crops severely, but late and frequent rains have greatly revived.

RHODE ISLAND.—*Washington:* Late rains have brought forward the grass to a full average.

CONNECTICUT.—*New London:* Grass looks very well. *Middlesex:* Late rains have started the grass very finely. Hay $10 per ton. *Hartford:* Grass crops injured by early spring drought.

NEW YORK.—*Tioga:* Grasses materially injured by drought. *Albany:* Meadows, especially old ones, look slim. *Jefferson:* Pasture two weeks late. *Livingston:* Clover wintered well. *Yates:* Drought seriously affecting meadows and pastures. *Lawrence:* Grass unpromising; hay crop light. *Franklin:* Grass backward. *Wyoming:* Clover winter-killed in some places; pastures short. *Otsego:* Meadows and pastures look fine. *Rensselaer:* Pasture short, but beginning to grow. *Ontario:* Grass backward. *Seneca:* Grass will be light and thin on the ground. *Washington:* Clover and pasture growing finely, but thin.

NEW JERSEY.—*Camden:* Clover and pasture very short. *Cumberland:* Clover improved by late rains, but pasture short. *Morris:* Pasture short except on low lands. *Mercer:* Clover, especially, shortened by drought. *Hudson:* Hay light: pastures short.

PENNSYLVANIA.—*Susquehanna:* Grass improving rapidly; grasshoppers dying out. *Lancaster:* Clover will not make over a half crop; pasture running very short. *Montgomery:* Clover injured by drought; spring pastures ten days late; recent rains have done good. *York:* Clover-stalks short, but well set. *Centre:* Grass not progressing. *Chester:* Spring pastures short. *Northumberland:* Grass badly frozen out in the winter, yet a large proportion survived and is again taking root. *Union:* Grass crops greatly improved by late rains. *Delaware:* Clover almost a failure. Timothy may yet come out. Less hay left over than for many years. *Lawrence:* Grass but a half crop.

DELAWARE.—*New Castle:* Hay severely affected by drought. *Sussex:* Pastures injured by drought and frosts.

MARYLAND.—*Frederick:* Grass crop almost a total failure; pastures shorter than ever known. *Howard:* Early drought left but little clover or pasture, even on good rich land; blooming but six inches high. *Cecil:* Hay crop short. *Kent:* Dried up.

VIRGINIA.—*Roanoke:* Grass crop considerably injured by early drought, but since improved by rains. *Spottsylvania:* Hay crop will be short. *Henrico:* Grass will not make over a half crop. *Stratford:* Clover severely affected by drought. *Craig:* Grass below average. *Surrey:* Clover and pasture 25 per cent. inferior. *Fluvanna:* Rain has greatly benefited the clover, but it will be short. *Orange:* Clover and other grasses wretched. *Madison:* The grass crop, except on moist low land, is almost an entire failure. *Rappahannock:* Meadows almost worthless. *Prince George:* Grass crop suffered from drought. *Bath:* Grass crop very short; without more rain there will not be a half crop of hay. *Amherst:* Grass crop shortened by drought. *Nelson:* Grass crop exceedingly short. *Augusta:* Clover heading out near the ground; meadows short and burnt out. *Gloucester:* Grass and spring pasture below average, while the exhaustion of winter provender made early grazing necessary. *Clark:* Clover and pastures short. *Prince William:* Grass suffering from lack of rain. *Wise:* Clover and pastures much injured by severe drought.

NORTH CAROLINA.—*Stokes:* Meadows recovered from drought by late rains; nearly up to average. *Surrey:* Clover and pastures much injured. *Gaston:* Clover culture increasing; crop looks well. *Moore:* Clover culture increasing. *Alamance:* Grass crop not good. *Haywood:* Pastures injured by drought. *Montgomery:* Clover and pastures damaged by drought.

SOUTH CAROLINA.—*Union:* Very little clover grown. *Georgetown:* Savannah grasses quite luxuriant. *York:* Clover growing in favor; can be profitably grown; drought has shortened the crop. *Anderson:* Pastures suffering from drought.

GEORGIA.—*Walton:* Clover promising; acreage increased. *Harris:* Red clover did well till the May drought. *Newton:* Growing interest in grass crops; clover acreage increased 300 per cent. *Hancock:* Clover culture increasing. *Wilkes:* Clover cultivation increasing; some lots grow three or four feet high. *Jackson:* Clover increasing for several years. *Marion:* The only clover-field in the county looks well. *Troup:* Clover looks well. *Fulton:* Great interest in clover; crop fine. *Butts:* Clover looks well; culture just commenced.

ALABAMA.—*Crenshaw:* Drought killing Alsike clover. *Lee:* Red clover successfully introduced. *Cherokee:* Recent heavy rains have improved the grass crops.

MISSISSIPPI.—*Wayne:* Grass in fine condition. *Rankin:* Rye for pasture looks well. *Smith:* Small experimental growth of clover.

TEXAS.—*Lavacca:* Spring pastures good. *Fayette:* No clover except Lucern will grow here, and that is not relished by live stock. *Gonzales:* California clover the only successful variety; acreage increased. *Johnson:* A small experimental growth of red clover and timothy doing well.

ARKANSAS.—*Columbia:* Wild grass better than usual.

TENNESSEE.—*Rhea:* Clover injured by drought, but improved by late rains. *Dickson:* Increased area of clover and grasses, indicating a new era of farming prosperity; clover has already diminished hog diseases. *Granger:* Hay will be 25 per cent. short, but quality better than when the yield is great. *Robertson:* Pastures and meadows shortened by drought. *Dickson:* Increased acreage of clover and grasses very advantageous to the farmers. *Monroe:* Meadows and clover shortened by drought. *Loudon:* Increased attention paid to grasses. *Greene:* The Italian and perennial rye-grasses promise to be an important acquisition—seed nearly ready to ripen. *Putnam:* Pastures and young clover very poor, owing to a flood and drought in April. *Sevier:* Clover and pasture short from severe drought. *Coffee:* Clover and hay crops considerably shortened by drought. *Obion:* Pasture very fine.

KENTUCKY.—*Nicholas:* Clover not so good as usual on account of drought and cool weather; spring pastures shorter than usual. *Laurel:* Clover has largely died out; spring pasture luxuriant. *Russel:* Drought killed young clover and grass generally; exhaustion of winter food caused the cattle to be turned on the grass fifteen or twenty days earlier than usual, depriving it of all chance of growth.

WEST VIRGINIA.—*Preston:* Grasses injured by drought. *Jefferson:* Clover badly winter-killed; hay will be scarce. *Cobell:* Grass greatly improved. *Nicholas:* Grass very short and backward.

OHIO.—*Sciota:* Fine prospect for clover; spring pastures good. *Warren:* Clover badly frosted. *Hancock:* Cut-worms hard on clover. *Pickaway:* Hay will be short; pastures need rain. *Lorain:* Pastures never better. *Adams:* Cut-worms have destroyed three-fourths of the clover.

INDIANA.—*Grant:* Cut-worms injuring the clover; crop will be short. *Elkhart:* Grass looks well. *Madison:* Cut-worms hard on grass. *Gibson:* Army worms in the meadows. *Perry:* Meadows look well. *Kosciusko:* Pastures unusually good; frost May 3 injured clover. *Putnam:* Cut-worms have nearly eaten up whole fields of clover. *Spencer:* Army worm destructive on meadows; hogs feed on them freely. *Boone:* Grass crops fine except a few fields injured by cut-worms, which have especially destroyed

the clover. *Washington:* Grass crops good. *Morgan:* Spring pasture never better. *Hamilton:* The old crop does not look well, but young clover very fine. *Hancock:* Good season for grass; some meadows destroyed by black cut-worms. *Wells:* Most of the clover over one year old destroyed by cut-worms.

ILLINOIS.—*Edgar:* Grass promising. *Cass:* Clover of former years nearly all winter-killed, but this spring's sowing is doing finely. Spring pasture, blue grass, and timothy never were better. *Pike:* Many fields of clover winter-killed; scarcely one has a good stand. *Logan:* Clover greatly damaged by winter cold. *Lee:* Pasturage looking finely. *Monroe:* Army worm destructive on timothy. *Boone:* Clover badly winter-killed. *Clarke:* Clover injured by drought. *Knox:* Clover on wet ground badly winter-killed.

MICHIGAN.—*Wayne:* Copious rains have improved the grass. *La Pierre:* Nearly all of last fall's sowing of clover ruined by drought. *Calhoun:* Drought retarded grass. *Van Buren:* Grass promising largely. *Montcalm:* Old clover fields badly winter-killed. *Shiawassee:* Grass crops improving. *Livingston:* Last year's sowing of clover lost.

WISCONSIN.—*Jumeau:* Grass promises an abundant crop. *Pierce:* Many fields of clover damaged by freezing where the crop was taken off last fall for seed. *Portage:* Spring favorable to grass. *Saint Croix:* Grass looking remarkably well. *Adams:* Clover acreage greater than ever before, the soil having developed a superior adaptation to that crop. *Calumet:* Quite a percentage of the land heretofore devoted to cereal growth has been laid down in meadow and pasture.

MISSOURI.—*Greene:* Hay crop will be large. Some meadows, seeded down for twenty-five or thirty years, will yield three tons per acre, a good admixture of clover remaining with the timothy. *Harrison:* Grass looks well. *Moniteau:* Meadows look unusually well. *Cole:* Hay crop very promising. *Pike:* Old clover largely killed; that sown this spring is doing well. *Carroll:* Clover generally winter-killed. *Callaway:* Clover and timothy sown this spring look very well.

IOWA.—Clinton grass looks very well. *Cedar:* Grasses growing finely. *Louisa:* Army worm injuring the meadows. *Guthrie:* Light rains have finely brought out grass crops. *Howard:* Clover badly winter-killed. *Muscatine:* Clover and pasture fine. *Floyd:* Clover badly winter-killed, especially last year's sowing. *Chickasaw:* Grass looks well. *Henry:* Timothy injured by worms resembling the cut-worm. Their work appears to be done, and they are dying. Hogs eat them greedily.

MINNESOTA.—*Meeker:* Spring pastures excellent since May 10. *Goodhue:* Large increase of clover. *Houston:* Grass promising.

KANSAS.—*Morris:* Pasture full average. *Cloud:* Clover first sown this year. *Republic:* A few experimental patches of clover.

NEW MEXICO.—*Doña Ana:* No clover except alfalfa, which is cut from four to six times from May to November, being used exclusively for green feed. The native grass —*grama*—may be cut the year round.

CALIFORNIA.—*Contra Costa:* The hay crops will be of poor quality, except that made from seeded-grain. Pasturage abundant, but the wild oats and clover are trenched on more and more by noxious weeds. *Placer:* Pasturage, though later than usual, is a full average and will last longer than for two years past, on account of the great amount of moisture left in the ground by the heavy rains. *Sonoma:* Hay and grass crops light; feed will soon be scarce on stock ranges. *Sacramento:* Clover-fields have been killed out by excess of rain. *Tuolumne:* Hay-crops will be light. *Alameda:* Hay a fair crop. *Nevada:* Much hay made in the southern part of the county by mowing oats and other grain. *San Joaquin:* Large crops of grass and hay.

OREGON.—*Umatilla:* Native grasses drying up. *Josephine:* Grasses short. *Douglass:* Alfalfa promises to be a good crop.

FRUIT.

Apples.—The apple crop of New England gives very fair promise. Reports from the different counties indicate an amount of bloom 28 per cent. above average, and an improvement in condition and prospects of nearly 17 per cent. above average. Every county reports a full average condition except Hartford County, Connecticut, where the canker-worm has reduced the average 20 per cent. This is the only county in New England from which any reports of insect depredations have been received. In Kent County, Rhode Island, a severe north-eastern storm denuded the trees of a large proportion of their blossoms, yet the general crop prospect is estimated at 50 per cent. above average. Norfolk County, Massachusetts, reports a very remarkable increase of bloom—200 per cent.—and an improvement of 50 per cent. in the con-

dition of the crop. These gratifying results are attributed to extra care in the destruction of the canker-worm.

The Middle States report a general increase in blooms of 17 per cent. above average and in condition of 9 per cent. In New York the apple-bloom is 16 per cent. and the general condition of the crop 9 per cent. above par. App'e-growers appear to be quite cheerful, except in Kings County, where it is said that apples have been deteriorating for several years. In New Jersey the apple-bloom was 21 per cent. and the condition of the crop 15 per cent. above average. In some counties the crop indicates great improvement, both in quantity and quality, results attributed to the destruction of insects by the extreme cold of last winter. In Pennsylvania bloom and condition of the crop, respectively, are 10 and 8 per cent. above average, every county except three reporting a full average. In Berks County the drought has caused much of the bloom to fall fruitless. Delaware reports an increase of 35 per cent. in bloom and of 16 per cent. in the condition of the crop.

In passing into the Southern Atlantic States, the averages of the fruit-crop begin to decline. In Maryland, while the bloom is 10 per cent. above average, the condition of the crop is 7 per cent. below. Drought, cold, and insects are reported in several localities as very injurious. In Virginia the crop is average in condition and 12 per cent. above in bloom. The ravages of frost during the blooming season are mentioned in different parts of the State. In Amherst County an unnamed insect is reported as killing both fruit and twigs. In several counties the fruit has fallen immaturely from the trees. In North Carolina the condition of the crop was 5 per cent. and the bloom 14 per cent. above average. No injuries from weather or insects are mentioned. South Carolina exhibits a decline of 4 per cent. in bloom and of 15 per cent. in the condition of the crop. In Lexington County the ends of the tree-limbs are dying, either from the ravages of some insect or from blight. In Georgia the bloom was 9 per cent. and the condition 5 per cent. below average. In some quarters the adverse influence of storms and wind is alleged, and in others cold and drought, to account for the decline.

In all the Gulf States the apple crop is below average, both in bloom and condition, the decline, in Florida, amounting to 20 per cent. In Arkansas the crop is considerably reduced in condition by caterpillars, which, in some places, have stripped the leaves from the fruit-trees. The weather, however, is generally reported as propitious to fruit-culture. Tennessee reports an improvement of 9 per cent., both in bloom and condition, though the curculio and caterpillar have commenced their ravages. In Grainger County the curculio is becoming more destructive each year. In Kentucky the apple crop is still more promising, the bloom being 13 per cent. and the condition of the crop 16 per cent. above average. The injuries from frosts are serious in some places, but more than compensated by extraordinary fullness at other points. Complaints of locust depredations have been received in one or two cases, but no other insect enemies are noted. In West Virginia, in several counties, fair prospects of the apple crop have been blighted by heavy frosts. The condition of the crop is 8 per cent. below average, though the bloom was fuller than usual.

Of the States north of the Ohio River, the crop is below average in Ohio and Indiana. From several points in these States come serious complaints of insect injuries and frosts. Our correspondent in Johnson County, Indiana, reports the caterpillars unusually destructive on

orchards; his own, however, had escaped, through his special care in protecting the birds. Illinois reports a large increase of bloom, but cut down by frost to an average. The curculio and caterpillar are reported as mischievous at a few points. In Michigan and Wisconsin crop prospects are full average, though retarded by lateness of the season. The severity of the winter seems to have had the good effect of destroying insects, none having been reported.

West of Mississippi River, the apple bloom was very full, and the condition of the crop is excellent, Kansas, especially, reporting an improvement of 21 per cent. The apple crop is safe in Doña Aña County, New Mexico, but was deficient in bloom in Beaver County, Utah. On the Pacific coast, the condition of the crop was depreciated 10 per cent. in California, and 21 per cent. in Oregon, by cold and frost, assisted in one county by caterpillars.

Peaches.—At the date of our report the peach had only begun to bloom in the northern New England States, yet in several counties a full average condition was observed, and in one instance an improvement of 10 per cent. Massachusetts reports one county in which the bloom was but one-tenth and the condition of the crop three-tenths of an average. All the other counties reported, however, show a full average with a very considerable improvement. Rhode Island declines about two-tenths in bloom and in condition of the peach crop, while Connecticut reports an improvement of 21 per cent. in the former and 13 per cent. in the latter.

The peach crop of the Middle States is slightly below average, both in bloom and condition, Delaware showing a decline of 34 per cent. of the former and 42 of the latter. In none of these States is there any mention of insect depredations, the extreme cold of last winter having been fatal to those pests.

In the Southern Atlantic States the crop appears to be nearly an average, the only serious decline being in Maryland, where the condition of the crop is 11 per cent. below average. In this State the drought has brought out the curculio, and the caterpillar is also active in some localities. In some parts of Virginia late and heavy frosts have either partially or wholly swept the crop, but in other localities it is full and promising. In North Carolina peaches are above average both in bloom and condition. In South Carolina, while the general condition of the crop is somewhat above average, the fruit is reported in some instances as falling from the trees. In Georgia, while the serious effects of cold and drought are acknowledged in some quarters, the especial improvement in others brings the crop to nearly a full average. The peach is below average in condition in all of the Gulf States except Texas. The curculio is reported in Louisiana, but the general complaint is of unfavorable weather. In Texas several counties report the crop as superior in quality though deficient in quantity. In Arkansas and Tennessee the season is generally reported favorable for peach-culture, both States reporting a very considerable improvement both in bloom and condition. Kentucky shows a decreased bloom but an improved condition. In some cases the crop was swept by late frosts. In West Virginia the crop is 28 per cent. below par, the fruit being largely winter-killed.

North of the Ohio the peach crop is very unpromising, except in Illinois, where the bloom is estimated at 17 per cent. and the condition of the crop 14 per cent. above average. Ohio reports but 35 per cent. of average bloom, and but 57 per cent. of average condition. In Indiana the figures under these heads, respectively, are 87 and 96. Michigan

reports serious loss to the peach crop from the severity of last winter, destroying not only the crop but also the trees. The bloom amounted to but 57 per cent. and the condition of the crop to 70 per cent. of an average. Our reports from Wisconsin and Minnesota make no mention of the crop whatever. The other States west of the Mississippi present very encouraging reports, ranging from 3 per cent. to 48 per cent. above average. But few casualties mar the cheering prospect. The Pacific States show a serious decline in the crop of California, being but 64 per cent., and in Oregon but 53 per cent., of an average condition.

Pears.—Reports from the pear crop of the New England States show an advance of 5 per cent. above average, both in bloom and in condition. New Hampshire and Rhode Island fall about 5 per cent. below par, the others being full average or above. The pear crop of the Middle States is about average in condition and bloom. Fruit prospects are nearly an average in New York and New Jersey, and above average in Pennsylvania, while Delaware reports but 88 per cent. of an average condition of the crop. Pears in Maryland, Virginia, and North Carolina are nearly average in condition, with full amount of bloom, but in South Carolina and Georgia the decline ranges from 10 to 20 per cent. in both. In the Gulf States the crop is considerably below average, though quite favorable in isolated localities. In Fayette and Gonzales Counties, Texas, pear culture is reported as remarkably successful. In Arkansas the crop was injured in some counties by insects, and its general condition is 4 per cent. below par, while in Tennessee it is a full average, and in Kentucky from 8 to 11 per cent. above. In West Virginia the crop declines 14 per cent. North of the Ohio River it ranges 91 to 101. West of the Mississippi the condition of the crop is considerably below the bloom, as also on the Pacific Coast.

Small fruits.—In Camden County, New Jersey, the strawberry-vines were nearly burned out by drought. In Jefferson County, New York, they suffered severely during the winter from extreme cold. Raspberries were injured by the cold weather in Northumberland County, Pennsylvania. In Henrico County, Virginia, strawberries will not make a half crop. Strawberries and blackberries were shortened by drought in Jefferson County, Louisiana. Small fruits killed in Thurston County, Washington Territory.

Oranges.—In Levy County, Florida, the young oranges are fast falling from the trees.

Grapes.—Grape vines were badly winter-killed in Alleghany County, New York, and in Northumberland County, Pennsylvania. In the latter county the varieties that best withstood the severity of the weather were the Concord, Clinton, and Telegraph. In Alexandria County, Virginia, the drought seems to have been especially favorable to grape culture, which is more promising than at any previous time.

Plums.—In Alleghany County, New York, plum-trees bloomed full, but in Jefferson County the trees suffered greatly from the severity of the winter. Plums were also injured by the weather in Clearfield County, Pennsylvania.

Table showing the condition of the crops, &c., on the 1st day of June, 1872.

States.	WINTER-WHEAT.		WINTER-RYE.		WINTER-BARLEY.		SPRING-WHEAT.		SPRING-BARLEY.		OATS.	
	Acreage compared with last year.	Average condition June 1st.	Acreage compared with last year.	Average condition June 1st.	Acreage compared with last year.	Average condition June 1st.	Acreage sown this spring compared with last.	Average condition June 1st.	Acreage sown this spring compared with last.	Average condition June 1st.	Acreage compared with last year.	Average condition June 1st.
Maine	102	101	99	98	.....	.....	108	101	100	103	105	102
New Hampshire	97	96	93	96	.....	.....	100	99	102	100	103	99
Vermont	99	105	93	100	.....	.....	102	106	102	101	112	106
Massachusetts	97	91	102	88	.....	.....	95	99	93	98	98	100
Rhode Island	.....	.....	88	88	.....	.....	.....	.....	95	101	86	104
Connecticut	95	88	100	85	.....	.....	98	98	100	100	98	95
New York	98	68	95	84	90	80	97	91	95	91	100	93
New Jersey	98	70	100	80	.....	.....	.....	.....	.....	.....	97	90
Pennsylvania	90	70	95	76	102	75	100	90	95	88	100	96
Delaware	96	70	90	55	.....	.....	.....	.....	.....	.....	100	66
Maryland	100	44	92	68	103	55	.....	.....	.....	.....	98	70
Virginia	98	85	93	83	.....	.....	.....	.....	.....	.....	98	72
North Carolina	101	101	97	100	105	99	.....	.....	.....	.....	99	90
South Carolina	96	97	100	93	100	100	.....	.....	.....	.....	102	87
Georgia	98	105	97	109	99	99	.....	.....	.....	.....	103	92
Florida	.....	.....	122	97	.....	.....	.....	.....	.....	.....	104	87
Alabama	105	115	97	113	97	113	.....	.....	.....	.....	110	82
Mississippi	95	104	96	96	.....	.....	.....	.....	.....	.....	110	89
Louisiana	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	110	101
Texas	115	117	105	108	83	125	.....	.....	.....	.....	112	110
Arkansas	90	110	109	102	.....	.....	.....	.....	.....	.....	110	108
Tennessee	103	117	101	105	93	107	.....	.....	.....	.....	102	93
West Virginia	100	85	97	88	.....	.....	.....	.....	.....	.....	102	86
Kentucky	92	108	102	105	90	100	.....	.....	.....	.....	95	99
Ohio	88	78	92	82	88	60	96	93	92	95	97	94
Michigan	92	75	96	93	112	98	110	98	94	98	107	100
Indiana	94	85	91	91	96	85	91	104	96	104	105	103
Illinois	101	80	94	95	100	86	75	103	84	100	105	106
Wisconsin	103	101	100	99	100	99	98	104	95	101	103	103
Minnesota	76	69	97	100	.....	.....	101	106	95	105	106	108
Iowa	102	80	99	93	106	102	106	111	107	107	107	108
Missouri	92	58	95	81	96	80	108	95	109	104	109	110
Kansas	62	46	100	83	105	96	140	108	120	104	135	110
Nebraska	125	50	117	98	.....	.....	113	114	107	113	114	115
California	130	99	115	108	122	93	120	96	102	98	99	98
Oregon	110	90	96	93	84	83	107	95	124	96	107	97

Table showing the condition of the crops, &c.—Continued.

States.	CLOVER.		SPRING PASTURE.	MAPLE SUGAR AND MOLASSES.		COWS.	COTTON.		APPLES.		PEACHES.		PEARS.	
	Acreage compared with last year.	Average condition June 1st.	Average condition June 1st.	Product of sugar this year compared with last.	Product of molasses this year compared with last.	Average condition of cows this spring.	Acreage compared with last year.	Average condition June 1st.	Average am't of bloom this spring.	Average condition of the crop June 1.	Average am't of bloom this spring.	Average condition of the crop June 1.	Average am't of bloom this spring.	Average condition of the crop June 1.
Maine	105	102	102	75	77	94	.....	.....	114	102	.....	.....	106	103
New Hampshire	101	89	91	53	53	95	.....	.....	125	115	.....	110	96	95
Vermont	104	110	106	67	71	89	.....	.....	105	127	100	.....	102	105
Massachusetts	109	85	86	62	57	93	.....	.....	125	105	110	.....	.....	.....
Rhode Island	90	101	96	.....	.....	91	.....	.....	123	120	78	80	95	95
Connecticut	97	92	91	.....	.....	89	.....	.....	132	123	121	113	128	126
New York	93	90	87	70	67	95	.....	.....	116	109	97	93	94	102
New Jersey	100	62	67	.....	.....	97	.....	.....	124	115	105	97	102	98
Pennsylvania	94	76	76	72	74	89	.....	.....	110	108	95	94	102	100
Delaware	100	86	73	.....	.....	86	.....	.....	135	116	66	58	100	84
Maryland	100	56	52	.....	.....	86	.....	.....	110	93	96	74	103	94
Virginia	98	77	77	114	114	89	104	95	112	100	104	97	106	98
North Carolina	111	94	90	.....	.....	87	116	96	114	105	106	104	100	98
South Carolina	157	113	76	.....	.....	87	109	92	96	85	98	103	83	80
Georgia	145	*102	97	.....	.....	91	112	96	91	95	100	96	90	85
Florida	.....	.....	100	.....	.....	86	110	95	100	80	98	98	.....	.....
Alabama	128	96	95	.....	.....	98	111	105	94	93	99	99	92	90
Mississippi	125	110	97	.....	.....	92	110	100	99	98	99	98	96	85
Louisiana	.....	.....	97	.....	.....	91	111	104	92	95	95	94	88	69
Texas	150	100	96	.....	.....	99	118	100	96	102	106	101	95	95
Arkansas	109	101	100	.....	.....	106	116	98	100	93	108	105	90	96
Tennessee	101	89	92	132	103	95	112	101	109	109	100	112	99	100
West Virginia	95	87	84	112	106	94	.....	.....	107	92	73	72	87	86
Kentucky	105	102	102	111	105	97	101	105	113	116	92	108	111	108
Ohio	99	93	92	76	77	99	.....	.....	101	97	35	57	99	91
Michigan	93	84	95	77	78	94	.....	.....	113	104	57	70	93	96
Indiana	97	97	100	91	90	99	.....	.....	106	94	87	96	103	95
Illinois	102	98	107	90	92	102	.....	.....	109	103	117	114	103	101
Wisconsin	108	103	105	77	72	97	.....	.....	101	102	.....	.....	93	93
Minnesota	114	99	103	100	97	99	.....	.....	117	106	.....	.....	.....	.....
Iowa	107	105	107	62	61	104	.....	.....	127	109	105	103	106	97
Missouri	108	109	110	100	103	101	110	97	117	109	140	130	108	105
Kansas	118	110	106	.....	.....	94	.....	.....	146	121	148	131	115	98
Nebraska	.....	.....	114	.....	.....	90	.....	.....	138	101	134	106	128	88
California	108	102	114	.....	.....	103	.....	.....	99	90	84	64	96	87
Oregon	102	101	101	.....	.....	97	.....	.....	126	79	82	53	134	70

AGRICULTURE IN CALIFORNIA.

The biennial report of the California State Agricultural Society for 1870–'71 has been received. A digest of its more important points may be of interest. According to estimates based on the returns of the county assessors, the value of the agricultural products of California for 1870, not including fruits, amounted, in round numbers, to $60,000,000, obtained from 2,596,612 acres under cultivation, averaging $23.10 per acre.

It is believed that in 1871, in consequence of the extreme drought, the product was somewhat smaller than in 1870, although the enhancement of prices went far toward compensating producers for deficiency in quantity. The wool-growers enjoyed especial prosperity, the yield of 1871 being about 25,000,000 pounds, returning 27½ cents per pound, against 19,472,660 pounds in 1870, returning 19 cents; showing an increase of over 82 per cent. in the value of the clip.

Of 80,000,000 acres of tillable land in California, less than 3,000,000 are under cultivation, the area thus utilized in 1870 being, by the assessor's returns, 2,596,612 acres. Of the total population of the State—namely, 560,223—nearly one-half, or 249,738, are residents of twenty-four of the larger cities and towns, leaving 310,485 for residents of the smaller towns, occupants of farms, &c. Census statements show 23,375 farms under cultivation in 1870, the products of which, not including fruit, averaged in value $2,567. This exhibit shows a small rural population and a vast amount of fertile land yet unoccupied for cultivation, and suggests the inquiry whether the prosperity of a region peculiarly rich in natural resources is not impeded by land monopolies.

Statistics collected by the State board of equalization show that in eleven counties 5,465,286 acres (more than double the whole amount cultivated in the State in 1870) are in the hands of one hundred owners, either individuals or companies, averaging nearly 54,653 acres to each proprietor. These lands, which, on an average, cost their owners $1 to $1.25 per acre, are chiefly held for sale in lots to suit purchasers, at prices ranging from $2 to $8 per acre. They are now assessed at an average value of $2 per acre, but were they divided into farms, and occupied as such, their average value would be increased at least $10 per acre, and this alone would add $54,652,860 to the taxable wealth of the State. Divided into farms averaging 160 acres, occupied by families averaging five persons, and yielding products of the same average value with those under cultivation in 1870, the result would be an addition of 170,790 to the rural population of the State, and of $126,000,000 to the value of its farm products.

This ownership by companies of large tracts held for sale at an advance on Government prices exists to some extent in all the counties in the State. The Central Pacific Railroad also holds within the State in the same way 3,000,000 acres. This transfer of vast tracts of unimproved land from the Government into the hands of private owners, who hold it for purposes of speculation, operates as a serious check upon immigration and upon the development of the State's resources.

Irrigation, floods, and swamp-lands.—An experience of twenty years, in which many millions of money and a large amount of property have been sacrificed by the failure of isolated and oftentimes conflicting attempts to prevent the ravages of drought and of flood, and to reclaim swamp lands, has proved the necessity of adopting, by State legislation,

some general system which shall include the entire portion of the State lying between the Coast range and the Sierra Nevada Mountains, and unite in one plan the threefold design of irrigation, prevention of floods, and reclamation of swamp lands. It is thought that such a system must provide additional channels to conduct through the great valleys the vast quantities of water that fall on the widely extended watersheds sloping into them, and that these channels must have outlets at some distance from the natural one, through which all the waters of a flood must be discharged. It is represented that an area of not less than 5,000,000 acres within the contemplated limits of such a system is now, in some parts, so liable to frequent droughts and floods, and in others so swampy, that it is unfitted to support any more than a scanty and unthrifty population; but the soil is of such a quality that if the proposed system were carried into effect it might easily support in a condition of permanent agricultural prosperity one person to every acre; that is, a population of 5,000,000.

Wood and timber.—According to careful estimates, which are deemed reliable, one-third of the wood and timber existing in California twenty-two years ago has been consumed. The requirements of the State for forest products will be, at least, ten times as great for the next twenty-two years. To dispense with the use of timber for fencing is to so far prevent the destruction of forests, and since the costliness of fencing material is now a serious drawback to the agricultural interests of the State, the subject of fence laws demands the immediate consideration of the legislature. At the same time no more important subject can occupy its attention than that of forest-culture. The most enterprising of the European states began, long since, to encourage by legislation the planting of forests. As the result, England and Scotland now have thousands of acres of majestic pines, beeches, and oaks; Germany has in government forests large groves of California redwood, with other valuable timber trees, collected from different parts of the world, and in France, Austria, and Russia, planted forests are among the most valued of government possessions. The scarcity of hard-wood timber in the State retards its agricultural prosperity by restraining the manufacture and enhancing the price of agricultural machinery and vehicles. Experiments, made through the efforts of the State Agricultural Society, have proved the groundlessness of a prevalent impression that the climate is unfavorable to the growth of hard-wood timber. These experiments have been sufficiently protracted to demonstrate that the best varieties of hard wood, including different species of locust, walnut, butternut, chestnut, orange, mulberry, and maple, will grow in the State more thriftily than in the Atlantic States, without any depreciation in durability, elasticity, or strength. Furthermore, some of the best varieties of hard wood indigenous to Australia have been imported and tested, with like results.

Products outside the ordinary limits of agriculture.—The manufacture of castor-oil, it is claimed, is becoming in the State a remunerative business, and that there is no reason why it should not be largely produced for export, all parts of the State being well adapted to the growth of castor-beans. In 1871 over 700,000 pounds of them were produced in the State; in Yuba County alone 600,000 pounds. Their estimated value is 4 cents per pound.

The cultivation of chiccory, successfully carried on for several years in Yolo County by a German firm, is represented as growing into an important business. In 1871 that firm produced of it, in a cured state, 135 tons, valued at over $20,000. Other counties are beginning to en-

gage in the business, and, as chiccory thrives on all river-bottoms of a sandy loam, it can be extended indefinitely.

Mustard-seed, English and wild, is another product which is engaging attention and promising to become an extensive source of profit. In 1871, of English, Monterey County produced 13,000 bushels, valued at over $20,000; while of wild, Santa Barbara County gathered over $40,000 worth, and other parts of the State enough to bring the value up to $60,000.

A successful beginning has been made in growing broom-corn. In 1870 the value of the crop, produced principally in Yuba, Sutter, and Amador Counties, was over $40,000.

The report further represents that encouraging experiments have been made in the State in the growing of tea, coffee, rice, New Zealand and common flax, tobacco, and opium. In regard to the two latter, it has been proved that certain California soils equal the best Virginia tobacco lands, and samples of opium grown in the State have been pronounced by experts to be quite equal to the best imported article.

TENNESSEE.

The delightful climate, rich soil, and valuable undeveloped mineral resources of Tennessee are attracting the attention of enterprising farmers, manufacturers, and business men of the Northern States. Many of the more intelligent and thrifty emigrants from the Old World are also directing their steps thither. Professor Louis Basse, a German gentleman of some note as a writer on agricultural subjects, recently located in Stewart County, West Tennessee, from which point he writes relative to the agricultural resources and capabilities, and great mineral wealth of that locality. He has been a resident of this country for six years, has traveled extensively over six different States, and, after a residence of one year in Tennessee, gives it as his opinion that it is one of the most desirable locations he has yet found. The country is mountainous, and the surface generally undulating. There is a great difference of altitude, and consequently a great diversity of climate. The valleys are narrow and the streams rapid.

In the whole region of East Tennessee but few marshes can be found, and, save along the larger streams and rivers, there are no considerable bodies of bottom-lands. The rivers being fed principally by mountain springs are clear and cool, and filled with many excellent varieties of fish, including the speckled trout. The valleys are very productive and well adapted to the growth of the grasses, clover, wheat, corn, oats, barley, rye, tobacco, &c. As a tobacco-growing region it is favorably regarded; it is also well adapted to the growth of the grape, which is now being extensively cultivated. That portion of the State is composed of four distinct varieties of land: the valley, the bottom, the ridge, and the mountain lands. The ridge lands are valuable only for their timber, while the mountain lands contain great mineral wealth, yet undeveloped. Coal is found in great abundance, and marble deposits are inexhaustible. The price of land ranges from $5 to $100 per acre, river or bottom lands bringing the latter price. The winters are mild, and the summers cool and pleasant; the air is pure, dry, and healthy. A casual observer would conclude that in a latitude of 36° north the weather would be very hot in summer; but the latitude is offset by the altitude,

so that upon the mountains lying along the eastern and western borders there is no excessive heat even in midsummer.

Further *data* concerning this region are furnished by the following letter from the pen of Mr. J. C. McKinney, of Rogersville, Hawkins County, on the subject of its soil, climate, agricultural capabilities, and mineral resources:

East Tennessee has been called the Switzerland of America. It is truly a mountainous country, but interspersed with fine alluvial bottoms and rich valleys. It is bounded on each side by high mountains. It is some two hundred miles long by one hundred miles wide, extending from the northeast to the southwest, in which general direction all the streams and mountain ranges take their course. Although called a Southern State, its productions are those of the Middle States. All the grains, grasses, vegetables, and fruits of Pennsylvania grow and do well here. Years ago cotton was cultivated, but it was found that we could do better in raising horses and mules for the two cotton States south of us, and hogs and cattle to feed their people. This was the kind of farming followed by most of us before the war, and we did well at it. But the war stripped us of our stock. Grain brought good prices, and we all turned our attention to its cultivation; but the price has gone down, and the seasons have not been good, so that, in addition to running down our farms, we find ourselves, after the last most unpropitious season, with no surplus to sell and no money.

The country is very irregular and unequal. The river and creek bottoms are rich, and produce all kinds of grains and grass equal to the prairies of the West. There are fine bottoms that produce well, then more broken land, until you come to the mountains, which are fit only for pasture. There is one feature of the mountains and all our hills which is, perhaps, peculiar—the southern side is generally thin land, while the northern is rich, producing good grain and grass to the very summit. We have fine timber of all kinds. The country is finely watered. We have good drinking-water, and water-power sufficient to drive any amount of machinery. Medicinal springs of all kinds exist, some of a very high character. It is entirely healthy; no section of the Western States is more so. Many persons from the North, afflicted with lung diseases, have found relief here. Owing to our altitude, our summers are no warmer than those of Pennsylvania. The winters are mild, there being but few days that out-door work may not be performed. This is a great advantage to the farmer, not only in the saving of fuel and the care of stock, but in many other respects.

Our farming, like the country, is unequal. Before the war there were many who followed a good rotation of crops, used improved implements, and their farms presented the appearance of careful cultivation. There were others, some owners of lands and some but renters, who cared nothing for improved machinery, whose farms presented a dilapidated and worn-out appearance. Since the war, unfortunately, the number of good farmers has decreased, while the class of renters, who care nothing for improvements, has largely increased. This class work the land on shares; they will neither manure the old nor clear up the new land. Our farms must be divided up and sold to men who will improve them, unless we can get a class of tenants like the English tenant farmer, who has some capital, and, renting a farm for a term of years, it becomes his interest to improve it.

The dairy business would do well here, as we have fine grass and good water, and long seasons for grazing. Some few who have tried it in a small way have done well. All kinds of stock do well, and our proximity to the cotton States gives us a good market for them. Our mountain-sides should be covered with sheep—there is no part of our country where they do better. A mixed husbandry is the kind for us—grain, grass, and stock. These will pay us best, and keep up the fertility of our lands.

CHANGE IN TEXAS CATTLE-RAISING.

Cattle-raisers are beginning to realize a change in the conditions which have hitherto secured to them certain special and anomalous advantages. A broad, free range of native grasses has relieved them of all care for the raising of food for their herds. The sole labor required hitherto has been in the collection and identification of each stock-raiser's cattle. The methods in use were effective enough when the business was in its infancy, but do not meet the necessities of its later

development. The increase of population and the opening of railroad communications with the northern and eastern markets have introduced conditions of production and transportation and of supply and demand which the old arrangements will no longer meet. In the coast regions—the theater of the earlier development of this industry—these changes are especially visible.

The great cattle range of Southwestern Texas is from the Nueces to the Rio Grande, (one hundred and fifty miles;) on the Colorado, fifty miles eastward, cattle change their range with the change of the weather, northers driving them to the timber belts for shelter, while sunshine allures them in immense masses to the open prairies. A correspondent of this Department saw 200,000 head gathered within a space of 20,000 acres of lowlands near the mouth of the Nueces River. These migratory tendencies of cattle render the task of collecting and identifying them one of great labor and difficulty, requiring the services of large numbers of men and horses. The employés of the cattle-raisers of a district organize hunting parties each spring and fall, in order to brand the calves. Each stock-owner is required by law to have a regular brand and ear-mark recorded in the office of the county clerk. In the semi-annual hunts each calf is branded with the brand of the cow it follows or sucks. A calf not found accompanying any cow is liable to be appropriated by the party who can first brand it. Parties attempting to brand, or otherwise appropriate cattle, without first making the proper record with the county clerk, are liable to a fine of $25 for each offense. Without such a public record no stock-raiser could protect himself from depredation by legal prosecution. Of late years parties have driven large numbers of sucking calves from their dams. The increasing demand for beef has created a stronger temptation for this illicit pursuit, necessitating greater efforts to repress it.

For the gathering of the animals for sale the same methods are used to some extent, but of late the cattle-raisers have been employing permanent agents in different parts of the country, paying them 50 cents for every calf branded and $1 for every steer herded for sale. A bill of sale is given to the purchaser describing the animals by brands, ear-marks, &c., which must be shown to the cattle inspector, who, in return, issues a certificate to the effect that the cattle correspond to the bill of sale. He keeps a permanent record of his official transactions, which is always open to inspection.

Among the noticeable changes made in the cattle business, since the close of the late civil war, is its concentration in fewer hands. The smaller owners found their stocks decreasing, and hence their profits did not meet their expenses. They have generally sold out, either to the larger proprietors or to the tallow and hide dealers. But few men now in the business have less than 1,000, branding about 250 calves. The herds range as high as 50,000; the number of calves branded being from 20 to 25 per cent. of that number. On these larger ranches are maintained from 2,000 to 3,000 horses, in order to supply the army of *vaqueros* with remounts. Large numbers of the cattle are killed for their hides and tallow. Some of these dealers sell to purchasers on the spot, while others ship direct to New Orleans or drive to Kansas. Several leading stock-raisers are mentioned as wintering from 2,000 to 3,000 each on the line of the Kansas Pacific Railroad.

The term stock-cattle, in Texas, includes cows, calves, yearlings, and two-year-olds. A party selling 1,000 stock-cattle would furnish 250 of each of the above classes, and charge a uniform price for the whole. The present price is $5 per head in specie. Three-year-old steers, or

four-year-olds generally bring from $10 to $12 per head. This class furnishes the staple of the Kansas trade. Four-year-olds, in good condition for shipment to New Orleans, bring $15 per head. The term beeves is applied only to animals four years old and upward. In good condition, they will net 500 pounds of beef per head.

The drought of last season caused a failure of the grass-crop in almost every portion of the State. It enhanced a growing difficulty in the grazing interest—the gradual failure of the abundant native grasses, which have hitherto constituted the great source of profits of the business. As the grasses are eaten down, or trampled down, weeds multiply and scatter their seed by the million. The mesquite brush is thickening upon the old haunts of the cattle. The conviction is forcing itself upon the minds of many of the more intelligent cattle-men that the range must be superseded by the stock farm, and that the business must assume a systematic character. The pasture-lands must be inclosed in order that the grass may gather headway.

The inclosure system has already been inaugurated in Southwestern Texas. Mr. Kennedy, of the Laureles ranch, has run a fence nearly fifty miles across the neck of a peninsula jutting out into the Gulf, thus inclosing, with fence and water, 160,000 acres. Within this inclosure are kept 50,000 cattle, the management of which demands 2,500 saddle-horses. Another enterprise of this character is reported from Fulton, Refugio County. The Rockport and Fulton Pasture Company proposes to inclose a tract of 115,000 acres with pine-plank fence on one side, the other sides bordering upon Nueces, Corpus Christi, Copano, and Puerto Bays and Chittepin Creek. The bodies of water are here so situated that thirteen miles of fencing isolates 200,000 acres. Upon the exterior portion of this area, called Live-Oak Peninsula, are the towns of Rockport and Fulton, whence are shipped all the cattle and beef west of the Guadalupe. The land inclosed for pasture is thickly set with the running, or hog-wallow, mesquite grass, the best native fattening grass. It is proposed to subdivide the area into fields, so as to allow grass to grow by keeping the stock away from it, and thus to keep a constant supply of fresh grass. The present object of the enterprise is to purchase lean cattle and fatten them for market. It is proposed to pay full market prices for range cattle and to rely for profits upon the increased value gained by grazing upon the pasture. It is expected that 40,000 or 50,000 beeves will be fattened each year.

It is further proposed to pay attention to the improvement of breeds of cattle and horses, a project entirely impracticable on the open prairie. Dairy farming will be added as soon as arrangements can be made. A refrigerating steamer, the Firefly, constructed according to the "Bray process," has taken several cargoes of fresh beef to New Orleans, and one cargo to Philadelphia. In both cities the beef is said to have given satisfaction. These improvements indicate that beneficial changes have already been inaugurated in the cattle industry of Texas.

IMPORTS INTO GREAT BRITAIN.

The following table exhibits quantities and values of certain imports into Great Britain (mainly those in competition with exported products of the United States) during the calendar years 1870 and 1871:

	Quantities, 1870.	Quantities, 1871.	Value, 1870.	Value, 1871.
Animal products:				
Bulls and oxen ..... number..	145,737	135,133	£2,622,778	£2,407,755
Cows ..... do...	24,910	73,639	391,269	1,031,999
Calves ..... do...	31,525	40,139	133,014	140,553
Sheep and lambs ..... do...	669,905	916,799	1,151,373	1,789,826
Swine ..... do...	95,624	85,622	356,471	292,089
Bacon ..... cwts..	536,844	1,017,907	1,668,096	2,507,470
Butter ..... do...	1,159,210	1,337,808	6,793,877	6,958,961
Cheese ..... do...	1,041,281	1,219,056	3,274,331	3,343,574
Eggs ..... great hundreds..	3,590,352	1,351,106	1,102,080	1,265,484
Hams ..... cwts..	30,320	65,114	101,145	195,325
Wool:				
From countries in Europe ..... pounds..	23,686,039	54,276,417	1,256,157	3,000,602
From British Poss'ns in South Africa.. do...	32,785,271	32,643,785	2,085,625	1,744,952
From British India ..... do...	11,143,148	19,494,009	345,356	697,523
From Australia ..... do...	175,081,427	182,753,585	11,136,138	10,846,342
From other countries ..... do...	16,666,078	30,343,540	534,343	1,147,387
Total	259,361,963	319,511,336	15,357,619	17,436,806
Corn ..... cwts..	16,756,783	16,832,499	5,790,550	6,470,789
Corn meal	5,741	7,881	2,682	10,712
Wheat:				
From Russia ..... cwts..	10,269,198	15,629,435	5,117,392	8,940,597
From Denmark ..... do...	327,919	130,370	165,301	77,791
From Germany ..... do...	3,348,214	3,049,031	1,949,805	2,018,292
From France ..... do...	253,644	134,841	140,119	72,345
From Austrian Territories ..... do...	60,472	239,147	29,071	158,475
From Turkey, Wallachia, and Moldavia.. do...	489,421	1,418,886	223,104	737,718
From Egypt ..... do...	104,950	884,396	45,239	489,741
From the United States ..... do...	12,371,922	13,405,057	6,564,341	8,062,414
From Chili ..... do...	599,337	549,529	360,841	358,427
From British North America ..... do...	2,838,361	3,279,264	1,537,855	2,005,698
From other countries ..... do...	237,791	687,690	130,959	424,132
Total	30,901,229	39,407,646	16,264,027	23,345,630
Wheat, meal, and flour:				
From Germany ..... cwts..	911,108	967,892	653,463	914,275
From France ..... do...	645,181	37,150	467,071	32,950
From the United States ..... do...	2,148,251	1,794,805	1,450,430	1,397,326
From British North America ..... do...	451,463	403,989	326,597	317,862
From other countries ..... do...	647,906	780,802	486,198	775,871
Total	4,803,909	3,984,638	3,383,761	3,438,284
Barley ..... cwts..	7,217,327	8,589,059	2,831,844	3,407,425
Oats ..... do...	10,830,630	11,007,106	4,381,607	4,001,687
Peas ..... do...	1,799,354	1,021,950	751,192	459,624
Beans ..... do...	1,505,798	2,975,651	648,755	1,269,424
Potatoes ..... do...	771,854	852,125	245,252	225,732
Seeds:				
Clover and grass ..... do...	213,779	340,377	603,298	927,113
Cotton ..... tons..	120,304	174,392	1,091,132	1,526,652
Flax and linseed ..... quarters..	1,490,695	1,334,945	4,016,016	3,744,588
Rape ..... do...	551,107	665,161	1,737,227	1,907,335
Cotton, raw:				
From United States ..... cwts..	6,395,079	9,317,368	31,345,348	33,220,259
From Brazil ..... do...	573,524	773,606	2,793,101	2,991,210
From Turkey ..... do...	93,245	23,099	406,391	86,778
From Egypt ..... do...	1,283,129	1,517,178	6,460,686	6,236,237
From British India ..... do...	3,049,434	3,818,630	9,980,121	11,609,338
From other countries ..... do...	564,224	394,009	2,492,108	1,623,723
Total	11,958,635	15,843,890	53,477,755	55,767,545
Esparto and other vegetable fibers ..... tons..	110,389	143,313	813,219	1,238,741
Tobacco ..... lbs..	86,430,318	111,517,416	1,680,140	2,563,625
Manure:				
Bones ..... tons..	92,032	94,212	591,701	591,998
Guano ..... do...	280,311	178,678	3,476,680	1,994,145

AGRICULTURAL PRODUCTIONS OF WURTEMBERG.

A statement of the agricultural productions of Würtemberg for 1870, recently received, represents the available area of arable land to be 2,138,659 acres, of which 1,905,236 are under cultivation, an increase of 5,001 acres over the previous year. The following table gives the average product per acre, the number of acres occupied by the several products, and the total of cereal and other products for 1869 and 1870.

Agricultural products.	Average product per acre in bushels.			Total acres under crops.		Total production in bushels.	
	1852 to 1866.	1869.	1870.	1869.	1870.	1869.	1870.
Cereals:							
Winter spelt	42.36	41.82	42.46	502,719	497,035	21,023,265	21,104,665
Summer spelt	30.10	29.45	30.20	3,088	3,196	90,940	96,570
Oats	29.60	30.41	24.94	322,768	321,958	9,815,500	8,030,140
Winter barley	21.70	26.44	24.49	3,874	4,213	102,450	103,185
Summer barley	25.17	26.31	24.27	227,187	231,924	5,978,915	5,628,685
Winter rye	18.62	22.29	21.44	89,214	86,816	1,988,650	1,861,600
Summer rye	17.09	15.93	16.31	15,855	16,052	252,660	261,850
Winter wheat	20.48	21.40	20.18	24,193	24,083	517,615	485,880
Summer wheat	17.14	18.67	18.50	7,486	8,105	139,755	149,915
Winter mixed spelt and rye	30.37	29.58	29.33	48,620	48,377	1,438,290	1,418,955
Summer mixed oats and vetches.	30.37	28.80	30.17	34,408	31,706	933,300	956,590
Millet	30.37	38.18	30.13	812	438	31,000	13,195
Buckwheat	30.37	34.08	26.48	93	91	3,170	2,410
Pulses:							
Peas	14.96	18.66	12.60	9,108	8,741	169,970	110,165
Lentils	14.77	16.03	11.97	9,561	8,917	153,240	106,755
Vetches	18.36	20.26	14.70	31,299	27,853	634,210	409,445
Field-beans	19.26	23.27	17.49	7,542	7,002	175,480	122,495
Garden-beans	19.26	23.29	17.54	1,998	2,027	46,430	35,530
Other products:							
Maize	22.34	25.37	23.40	4,527	4,690	114,835	109,740
Potatoes, (sound)	110.74	99.75	157.51	175,221	177,052	17,478,540	27,878,489
Potatoes, (not sound)						1,146,426	1,674,811
Sugar-beets, tons of 2,000 lbs	10.607	45.063	9.857	11,968	10,904	539,310	107,394
Turnips for seed, tons of 2,000 lbs.	10.607	.471	.985	31,501	33,000	184,486	325,017
White turnips, tons of 2,000 lbs.	9.887	9.886	9.888	16,742	16,949	165,515	167,578
Cabbage, number	3613.00	3153.00	2411.00	15,130	15,347	47,705,432	37,005,395
Yellow turnips, tons	7.72	6.49	6.91	288	296	1,869	1,986
Rape and rape-seed, bushels	16.11	16.63	16.41	16,953	21,604	281,940	354,670
Poppy, do	14.70	15.87	9.22	7,901	7,187	125,410	66,285
Flax, (combed), pounds	125.95	123.11	73.13	17,490	16,775	2,154,178	1,226,731
Hemp, (combed), do	171.48	171.89	149.71	19,723	19,504	3,390,314	2,920,006
Hops, do	524.01	351.91	614.81	12,432	12,648	4,375,030	7,776,120
Tobacco, do	1213.25	1182.50	1212.16	172	254	203,390	307,890
Chicory, do				1,468	1,913		

In 1870 there were in red clover 163,856 acres, yielding 349,426 tons, at the rate of 2.13 tons per acre; in lucerne, 38,917 acres, 92,961 tons, 2.39 tons per acre; esper clover, 27,974 acres, 46,210 tons, 1.65 tons per acre. The harvests of hay on 659,491 acres were, in 1870, 1,168,054 tons; in 1869, 1,478,114 tons; 1868, 933,442; 1867, 1,547,202; 1866, 1,331,697.

The fruit production has been quite variable. The average for 1852 to 1861 was 2,686,203 bushels of kernel fruits and 482,318 bushels of stone fruits. In the four years ending in 1870 the extremes were from 4,213,163 bushels in 1867 to 423,433 bushels of kernel fruits in 1869; and of stone fruits, from 797,296 in 1868 to 134,409 bushels in 1869.

Of 58,074 acres in vineyard in 1870 but 44,505 were cultivated, which yielded 3,692,209 gallons of wine, or 83 gallons per acre. Of this product 1,877,477 gallons were sold for $1,334,813, an average of 71 cents

per gallon. On this basis the total production was worth $2,621,468. The following table presents a view of the vintages for ten years past:

Year.	Production in gallons.	Average price per gallon.	Total value of production.
		Gold, U. S.	
1860	1,483,607	$0 57	$848,862 18
1861	1,164,619	1 47	1,712,948 43
1862	2,901,974	1 23	3,568,191 05
1863	3,448,306	1 04	3,581,763 28
1864	936,426	93	871,819 49
1865	1,205,703	1 98	2,387,629 67
1866	1,257,626	1 34	1,694,580 43
1867	3,105,932	80	2,495,188 66
1868	5,547,986	1 08	6,006,583 69
1869	1,703,793	1 12	1,919,002 95
1870	3,692,209	71	2,621,468 39

The prices of wools, according to local classification, (four-fifths being "bastard" or grade wools,) have been as follows since 1863:

Year.	German wool.	Bastard wool.	Spanish wool.
	Cents.	*Cents.*	*Cents.*
1863	32.7	42.8	59.5
1864	41.7	48.3	57.6
1865	39.05	43.7	55.8
1866	33.5	39.4	48.3
1867	41.7	41	60.02
1868	31.6	40	50.02
1869	20.08	29.7	42.8
1870	27.9	37.9	50.6

SOUTHERN PLANTING AND NORTHERN FARMING.

BY THE COMMISSIONER OF AGRICULTURE.

The great diversity of climate and soil which characterizes this extensive country renders the task of reviewing the principles and practices of farming, as they prevail in various quarters, exceedingly difficult; for that which observation and experience have taught to be entirely successful and profitable in one region, would be very inappropriate and entirely fail in another. In our agricultural journals and elsewhere we meet constantly with discussions as to the best modes of cultivation; and while the contestants, reasoning from their own experience, seem to differ essentially, it does not necessarily follow that each may not be right in the doctrine which he advocates; they may have only failed to recur to the fact that they reason from stand-points and accompanying surroundings which differ as essentially as the doctrines they respectively advocate. This may be illustrated by recurring to the oft-repeated discussion of the merits and demerits of deep and shallow plowing, while the solution of the problem is clearly to be found in the character of the particular soil to be plowed; for while a tenacious clay subsoil may be most profitably plowed to any depth which can be enriched by cultivation and manure, a good surface, having

for its base a sand or gravel subsoil, may be plowed so deep as to reach a bottom which has no capacity to hold either water or manure. Thus should that question be settled everywhere. The earth that is plowed the deeper will receive the most and retain the longer the rain that falls upon it, and of course furnish a greater space in which plants may feed and grow; and besides this, it affords a reservoir into which, in freezing weather, the rain may settle from the immediate root of the growing plant, which thus escapes from being embedded in ice, and spewed or frozen out, as clover and wheat often are in the Middle, Western, and Northern States. But the whole subject of deep and shallow plowing is one which every farmer must study in connection with the character of the soil he cultivates, and govern his practice accordingly; keeping in view, however, that a fresh, uncultivated soil, brought to the surface for the first time, may disappoint his expectations in its capacity for fruitfulness, until it shall have received the benefit of manure, and especially the amelioration of light and heat.

The subject of rotation of crops is one which deserves especial attention, and which must be considered with reference to the locality where it is practiced; but that it is an essential principle which must enter into the successful operations of the farm, is as certain as that a diversity of food conduces to the health, strength, and mental capacity of man. The analogy is by no means an imperfect one. What can be so plain, if we but reason from natural cause and effect, as that bringing into requisition again and again the same means of production, the same muscular powers of locomotion, the pursuit of the same train of thought, serves but to exhaust the soil, as it debilitates and exhausts the capacity of man? The earth will certainly cease to yield a product of the constituent parts of which it has already given all it has. And here let us consider the result and effect of continual restoration of the soil by the application of superphosphates, guano, and other commercial manures. Will not this supersede the necessity of rotation? All these may contain many of the component parts of production, and most of them are soluble in water, and, therefore, more immediately convertible into plant-food, stimulating in its character, quickly bringing into requisition the powers of the earth, and consequently in the same degree exhausting those powers; and like spirits habitually administered to the body, requiring an increase of quantity to produce a like effect; and eventually increase loses its power, and the earth, like the body, dies from exhaustion. There is an active, living principle in a diversity or rotation of crops, which nature dictates, as is exhibited in the practical operations of the farm. Dig up an old apple-tree, and a young one will not grow successfully upon the same ground, and no manure will make it grow. It is vain to theorize upon the subject, and we may as well conclude that there is no substitute for a rotation of crops in a proper management of the farm.

But what shall the rotation be? Here we must recur to the idea that while it is indispensable, it must be regulated by circumstances. In the Middle and some of the Western States the usual routine is clover, corn, oats, or spring barley, wheat, and with it timothy and clover; the former sown with the wheat in the fall, at the rate of about three quarts to the acre, and clover in the spring, about one bushel to five acres. This grass is mowed and made into hay the second year, and often the third; then the manure of the farm should be put upon the sod, and again it goes into corn. By this rotation the land continues to grow better and more productive from year to year.

There are points at the South, and also in the West, where this rotation

cannot be pursued, because the soil and climate are not congenial to the growth of all such grain. If so, let others be substituted; but if there be any point where grass of some kind cannot be raised, then it had better be abandoned as an agricultural district, and appropriated to some other purpose; for it may be questioned whether anything that grows out of the earth can be grown profitably where grass will not grow. Grass is the great renovator of the earth, and will always grow, with the use of lime, where land is worth cultivating.

The marked contrast between the modes of culture of the farmer of the North and planter of the South is not to be traced to any essential difference in the principles by which the cultivation of the earth should govern the one or the other, but is rather to be accounted for by the circumstances of these localities. Climate has had much to do with the subject, the character of labor more, and the education and habits of the respective populations greatly conduced to the essential differences in the practical operations of the farm.

In the Southern States it is as uncommon to meet with a barn, as a place of preparation of the products of the plantation, as it is in the North to find a farm without one. The planter contents himself with the reflection that his cattle require no such shelter from the elements with which he is surrounded; while the farmer estimates his barn, not only as a shelter for his cattle from wet and cold, but as a manufactory of the only fertilizers upon which he relies to improve his land; and not only this, but as a place where his products are prepared for the market without waste or deterioration, and from whence the straw, hay, and fodder are distributed to the cattle for their comfort and for the profit of the farmer. The southern planter will not realize the truth of this, although he finds himself scattering over a thousand acres; abandoning one spot with the hope of finding another less exhausted, or perhaps somewhat rested from the fatigues of a series of crops of the same thing; while the northern farmer, with his well-farmed hundred acres, will be found to increase the fertility of his land and add to his acres year by year. We have almost said that a barn is essential to the operations of the farm; that it is through its instrumentality that it is fertilized and improved; while the manure of the barnless plantation is wasted upon the desert air.

All other questions respecting the management and economies of plantation or farm management resolve themselves into the consideration of labor, its character and qualities. Our southern people are essentially agricultural. They have had no other subsisting interests to any extent. The existence of servile labor, imposed upon the minds of the land-holders, made it a part of their earliest education that labor was degrading. This was a necessary consequence of a system in which men were born to command and obey. However well educated, their minds were not turned to the subject of agriculture. They had no necessity to investigate the practical workings of the plantation; that was in other hands, whose special business it was to oversee as well the labor as the laborer. But now there is a new state of things, when it will become imperative upon the owners of estates to study agriculture as a science, to think and plan for themselves, to devise their own modes and schemes for the improvement of their lands and the economies of using hired labor. It does not necessarily follow that planters have suffered anything in the change of the character of their laboring hands; experience has proved that they have lost few or none of them; and when we remember the amount of work accomplished by one who earned at most but a mere subsistence, who was engaged in a duty of which he

would accomplish just as little as he might, and performed it as badly; and now, when he shall have been stimulated by the hope of gain, the fear of competition, the approbation of his employer, and, not least, the anticipations of an independent home, it is questionable, if not clear, that the planter will, in the end, be benefited by the change. There is, to say the least of it, great encouragement in the consideration that laborers in the South are not wanting, that their labor is not too expensive, and that the products of their soil are well paid for in a never-failing market.

There is a great disparity, even now, between the conditions of northern farmers and southern planters; for, apart from the mere consideration of the sacrifice of human life, the former were rather benefited by the results of the war, while the latter lost their all, and were driven to the resort of double and triple cropping to meet their actual necessities. Hence the soil has been exhausted, and nothing but the lapse of time will enable them to restore it; and that, too, by a rotation of crops to which grass must contribute largely. There is no mode by which the fertility of the soil can be so cheaply restored as by clover.

The size of plantations in the South is a great drawback to judicious farming. It has been clearly demonstrated that one hundred acres carefully and judiciously tilled will, with the same labor, produce as much as two hundred carelessly farmed. It is not enough that the surface be loosened, and seed be committed to the earth, to insure an adequate yield. The ground must be well and deeply plowed and plowed again; it must be well harrowed and harrowed again, until it is brought nearly to the condition of the seed-bed of a garden before the seed is committed to it; and then the seed should be selected with a degree of care which will insure the separation of the indifferent and the good. And this is a point of the utmost importance—far greater than is usually attributed to it. No matter what the seed may be, there will be found good, bad, and indifferent among it; and that these should be separated is as fixed a principle as that better seed will produce a better plant, and that a better plant will produce better cotton, tobacco, wheat, or corn. To separate them is not a question of labor or expense, for it may be relied upon that the result will repay it fourfold. How they may be separated may be answered by saying that indifferent seed is almost invariably lighter, and that the winnowing-mill, which will blow fifty bushels of seed from a hundred, renders a most valuable service to the result of a bountiful production.

There is one more subject to which the attention of farmers everywhere should be drawn—the pasturage of cattle upon land when it is wet. There is no one whose experience has not taught him that to plow land when it is wet is injurious to it. The reason is manifest: The earth may be said to be a set of mouths and lungs which feed and breathe; to plow it when wet shuts up its capacity to feed and breathe; in other words, it smears its surface so as to make it impervious to light, air, and heat, for the want of which it dies; and a death, too, from which resuscitation is extremely difficult. This same consequence is the result of pasturing cattle upon lands whose surface has been made wet by rain or otherwise; it is worked into a mortar incapable of producing fruit.

Farming, like all other of the occupations of life, requires a study of the scientific principles which enter into it, thought of the modes of their application, and especially the observations of practical experience; and these combined will always produce profitable results.

Prejudice often puts its seal of thoughtless reprobation upon what it

scornfully terms book-farming; but the farmer need not fear to learn his art from any source. If the chemist has analyzed the production of the soil, and found, to an unqualified certainty, its component parts; and if natural philosophy teaches that these component parts are taken from the earth, the lesson is certainly taught that the earth becomes exhausted by a continuous draft upon it, and eventually ceases to yield the product. If he discusses the chemical properties of lime, and its effect when brought in contact with the earth—when, therefore, it may be profitably applied and how used—such discussion may be turned to a most practical and profitable account by the farmer. If the entomologist has carefully studied the life and habits of the bugs, flies, and worms which infest the earth and all its growing vegetables, plants, and fruits, and teaches the nature and extent of their depredations, and thereby, to some extent, puts it in the power of man to thwart their operations; if he puts into our possession the facts with regard to the character of birds which are insectiverous and which are not, which are destructive and which are not, thus enabling us to guard against the one and protect the other; if the investigations of the botanist point out the nutritious, fibrous, or medicinal character of a plant, and where it will grow successfully and where it will not—what distinguishes one plant from another; if the natural philosopher treats of the nature of the earth itself, and how it is affected by light, and heat, and air, and how it gives life to the germinating seed, and strength and stature to the growing plant; if, in fine, it be the unchangeable laws of God which give vitality to every living and growing thing upon the earth, is it not well that the farmer should study to know what those laws are, and give them their most potent influence to produce the best results from the work of His hands?

DETERIORATION OF COTTON AND SUGAR-CANE.

BY THE COMMISSIONER OF AGRICULTURE.

By the extensive and intimate intercourse which this Department has with the agriculturists of the country, it has been strongly impressed with the idea that the products of grain, cotton, and sugar have much depreciated in quantity, and, it has been alleged, in quality also; that this is a very unnatural and alarming result, of what is undoubtedly an improved condition of agriculture, must strike the mind of the most casual observer; and it has induced the Department to inquire particularly, and gather the facts, and elicit the opinions of cotton and sugar planters and dealers on the subject, with the view of knowing whether it was within the scope of authority of this Department to come to the rescue or aid of interests so important. To effect this object, letters were directed to many intelligent cotton and sugar planters in all the Southern States tending to elicit answers to the following inquiries:

1st. Have these products deteriorated in quality or quantity?

2d. And, if so, to what source do you attribute such deterioration?

3d. Can this Department do anything to remedy the evil?

These letters have been extensively responded to, and it is gratifying to believe that much intelligent thought has been given to the consid-

eration of the subject. While much comment is made upon the effect produced by the great change in the character of labor, and the want of control over it, which the planter has once had, a compendium of the whole correspondence leads to the inevitable conclusion that both cotton and sugar have diminished in the quantity of production, but that neither has depreciated to any extent in quality, and the cause of failure is most unerringly traceable to the planter himself.

If this Department can impress upon the planters of cotton and sugar the indispensable importance of selecting seed and careful cultivation, it will have accomplished the introduction of a remedy which will cure the evil. What are the "Dickson," the "Boyd," the "Peeler," the "Hurlong," but the productions of selection? Does not all nature teach that in her operations "like produces like?" A letter in possession of the Department from an individual at Montezuma, Georgia, gives most satisfactory assurance that he has increased his crop of cotton 20 per cent. by the continued pursuit of selection for a few years; and all the testimony everywhere coincides with this experience.

In the preparation of cotton-seed, what is the practice now, and what should it be? The seed is promiscuously taken from the gin, carelessly thrown upon a heap, where it remains until planting-time, and without regard to any selection of good or indifferent is again committed to the earth to make its bad or indifferent product. Is this practice adopted to avoid the labor of selection, or is it really traceable to a want of faith in the superior value which good seed has over that which is indifferent; or is it a commingled feeling of doubt and slothfulness, with a want of that degree of energy, without which planting should be the work of other hands?

A few figures may serve to convince, when mere reasoning may fail. The vigorous plants which first mature are always best for selection. One hand will gather in a day 150 pounds of cotton which will produce 108 pounds of seeds, and this will plant two acres of ground; so that it will require 25 days' work to secure the selected seed for fifty acres. Allowing nothing for the cotton picked, this selection will cost, at $1 a day to each hand employed, $25. Assuming the product without the selection of seed to be at the rate of half a bale an acre, the amount would be 25 bales of, say, 450 pounds each, being 11,250 pounds, estimated to be worth at home 15 cents a pound, or $1,687.50. Now, the evidence is incontrovertible that a careful selection of seed will increase this product 20 per cent., or an amount of $337.50, from which deduct the $25 paid for selecting, and there is a clear gain of $312.50 upon a single crop of 50 acres. When it is remembered how seed is usually taken from the gin, and how it is stored away for future use, and the process of degeneracy occasioned by heating, it is not at all wonderful that the estimate of the increased yield from pure, selected seed should be 20 per cent. Indifferent seed produces an infirm and sickly plant, and a consequent diminution of cotton. Practice sanctions the use of from two to eight bushels of seed to plant an acre of ground, and the planter consoles himself with the idea that it is not lost; but this is only partially true, for this wasteful mode of converting seed into manure is not justified by the benefits derived. It would be far more profitable to subject the seed, as it accumulates at the gin, to an application of plaster of Paris, and muck from a swamp, or pine shucks or leaves and earth from the woods, and thus convert the refuse cotton-seeds into a compost which will tell with ten-fold the effect upon the crop of cotton to which it is applied. One bushel of well and carefully selected seed will be quite sufficient to plant an acre of ground in hills,

twenty inches apart and in rows four feet apart. But, after all, the planter must be convinced that a rotation of crop is absolutely indispensable to any operation for a series of years. If the plantation contains 200 acres let 50 of them be in cotton, 50 in corn, 50 in peas or beans, and 50 in grass; and let the crops alternate; and it cannot be doubted that if this process be pursued for a series of years, the 50 acres will have grown more cotton than 100 under other circumstances. The use of lime, if it can be procured at any reasonable expense, will always insure the growth of grass.

With respect to the cultivation of the sugar-cane, the same principles which it has been endeavored to enforce with regard to cotton-planting are equally applicable. While several correspondents press the idea of the necessity for a new importation of cane, the great weight of opinion is that the diminution in the quantity of production is occasioned by careless selection and planting of the cane, and subsequent careless culture. It is manifest that little or no regard is paid to the quality of the cane planted; that dry, hard, woody canes, often perforated with borers, are used, instead of those with healthy, succulent tops; and this under a thoughtless or careless impression that, if the sprout appears at all, it may produce a vigorous and healthy plant, whereas it will certainly maintain its sickly existence out to the end, with a result in production like to its origin. Beside careful selection, however, subsequent culture, in order to improve the character of cane, is all important. What but cultivation has brought to their present condition and excellence almost all the roots and seeds with which we habitually deal? What was the corn, the wheat, the potato, the apple, peach, pear, and plum before they passed through the manipulations of careful culture? Does not all nature teach that her productions were committed to the care of man that they might be cultivated and improved? And is it not equally manifest that there is no such principle as natural degeneracy which belongs to God's providence? for, if it were otherwise, the world could not have lasted four thousand years; it would have long since degenerated into a fruitless waste. It may be relied upon as a self-evident truth that careful culture will improve the character of any vegetable as certainly as the neglect of the selection of seed and its careful cultivation will degenerate it.

In the proper cultivation of sugar-cane, those same agricultural principles which experience has taught to be so conducive and so essential to the successful growth of fruits and plants must be observed. You must return to the soil what you take from it; and this must be done through the medium of a direct application of manures and a rotation of crops; and without either of these the experiment will prove a failure in the course of time. Manure alone will not do; rather depend upon rotation alone. A division of the farm into parts, such as is recommended for the cotton-plantation, is equally applicable to sugar, and the result of such a practice would double the crop upon every acre. The bagasse of a sugar-plantation is largely wasted, for the want of the application of a little expense which would add four-fold to its value. It is sometimes thrown in a pile to burn to death by its own internal heat, or actually burned as fuel in the operation of sugar-making, which is a most wasteful use, for the ashes are by no means equal to the thing itself. If, when this bagasse is taken from the mill, it were mixed with earth and lime, it would furnish an amount of manure equal to covering a space as large as that from which it was taken. As to cotton, plaster of Paris was recommended for this purpose, because it preserves the ammonia; whereas, in the cultivation of sugar, nitrogen, which is the basis of ammonia, is probably inimical to the formation of sugar.

A summary of all the information which the Department has been enabled to collect results in this conclusion: that Louisiana has a soil and climate adapted to the cultivation of sugar; that these lands are generally in the hands of intelligent planters; that they need but to pursue the plain dictates of natural laws to restore the cane to its superior excellence, and its product to its largest yield.

It is a subject of congratulation that the Department has been advised of the effort now being made to procure a new importation of sugar-cane into Louisiana, that the quality may be thereby improved. It may be so, even under the necessary process of acclimation and adaptation through which it must go. But, if it is to be planted time and again upon the same ground, and no selection of plants to be made, it, too, must soon "go the way of all flesh."

EPIZOOTICS AMONG SWINE.

By the Commissioner of Agriculture.

In the monthly report of this Department for April last, under the title "Diseases of swine," the attention of the people of the country was called to the enormous losses which were annually sustained from epizootic diseases among swine. All these diseases, however differently they may affect the life of the animal, are called "hog-cholera;" because of our ignorance of the subject we cannot give to each case a name specific enough to indicate its true character. In our comparatively new country veterinary surgery has not attained that degree of eminence as a scientific profession which its importance demands; on the contrary, we have actually suffered from the estimate which is put upon such learning and practice. But we are now startled by the fact that for the past ten years the loss of the whole country has exceeded ten millions of dollars annually by epizootic diseases, at which we fold our arms with amazement, and wonder what it is.

The June number of the National Live-Stock Journal, published at Chicago, furnishes, under the title "Epidemics among swine," an excellent article on this subject, in which, among other things, it says: "Under such circumstances it would seem as if the Department of Agriculture would have instituted some investigation into the cause, nature, and proper treatment of this malady, and have had something to offer the country in relation to the prevention and control of diseases which have proven so destructive." But this is unmindful of the fact that this Department has no means for the institution of such inquiry. Appropriations for its workings are all specific; and it would be a violation of the duty of the Commissioner to direct them to other objects than those specified. The work is so important and so peculiarly scientific and professional that it should call to its performance the greatest amount of learning with the best practical skill the country can command. The necessity for the action of Congress to make provision for the appointment of a commission which may thoroughly investigate the subject, as it did with regard to the diseases of cattle, cannot be more strongly enforced than it is in the article of the National Live-Stock Journal before referred to, and which we here quote as expressing the views of this Department on the subject:

> We have never been more strongly impressed with the necessity of a general investigation of this subject by competent authority than when considering the details fur-

nished by the last report of the Department. For these reports show the people to be absolutely ignorant of the matters which the general prevalence of these epidemics render it essential that they should know. "Hog cholera is the term indiscriminately applied to the diseases of swine generally," says the Commissioner, which illustrates very forcibly the inability of swine-breeders, in the present state of popular information, to distinguish one disease from another. Everything is known as hog-cholera, while there may be two or three diseases of entirely different types, which, if they could be distinguished one from another, the breeder could very soon bring under control; and the diseases being confused with each other, remedies are administered for one, which would have proved valuable for another, and he is now powerless to accomplish anything. Whether there is one epidemic disease or half a dozen, whether different epidemics are prevailing in different sections, or the same epidemic is prevailing everywhere and modified by climatic influences, are matters which will never be certainly known until the Department of Agriculture secures the services of a corps of competent, scientific gentlemen, and institutes, under their direction, an extended series of experiments and observations.

Here is one locality where rotten wood and bituminous coal are generally resorted to. Another, where a mixture of tar and sulphur is the popular favorite. Another, where tar, turpentine, and chlorate of potash were believed to be effective. Another, where coal-ashes, salt, sulphur, sulphate of antimony, soap-suds, charcoal, and rosin were used separately or in combination. Another where cooked food and tar form the basis of the farmer's hope. Another where common poke-root, fried in grease, was believed to be the only remedy. Another, where burning the skin with a hot iron was regarded as sovereign. Another, where salting, slopping, copperas, alum, and sulphur, and still another where alum, sulphur, copperas, madder, black antimony, and saltpeter pulverized and mingled with grain were generally relied on. In other localities coal-oil, coal-tar, and lime were used.

The popular ignorance of the matter, as shown by the remedies in use, is still more plainly shown by the popular ideas concerning the cause of the disease, which was believed to be occasioned by still-feeding in Westmoreland County, Pennsylvania; by poisonous mushrooms and unripe berries in Buchanan and Surry Counties, Virginia; by ticks in Yalabusha County, Missouri; by lice and mange in Macon County, Georgia; from eating cockle-burrs in Phillips County, Arkansas; from the heavy beech-mast in Obion County, Tennessee; by eating cotton-seed in Madison County, Tennessee; to the mast in Laurel County, Kentucky; and to the want of it in Champaign County, Illinois, &c.

There is evidently a great public necessity, and most abundant room for some investigation of these matters, such as the Government alone can conduct to a satisfactory conclusion.

ENTOMOLOGICAL RECORD.

By Townend Glover, Entomologist.

A new grasshopper.—Two full-grown specimens, a male and a female, of a very singular and apparently new orthopterous insect, resembling *Conocephalus ensiger*, or conical sword-bearer of Harris, were taken alive in the green-house of the Department of Agriculture, last season, by Mr. J. H. Brummel. A short time previous, two half-grown larvæ were found, but died soon after being captured; and the remains of a fifth full-grown imago were found, when cleaning out the flower-pots in the winter.

These insects injured the leaves of the coffee-plants, rose-apples, and bananas, in the green-house, much in the same manner as is done by

our native katydids, by eating holes in the leaves and gnawing away the edges. Their jaws were remarkably strong and sharp, and when the insects were incautiously handled they bit so severely as to draw blood. The male was about 1.75 inch in length from the tip of the cone, or horn on its forhead, to the end of its wing-covers when closed. The female measured 3.05 inches to the end of the ovipositor, which itself was at least 1.25 inch in length. The general color of both male and female was a light pea-green, and the wings were delicately veined with distinct nerves, resembling the venation of leaves. A very marked feature in this insect, when alive, is that the labrum and clypeus are bright yellow, contrasting strongly with the jet-black of the mandibles, which, together with the cone or horn on the top of its head, gives it a remarkable appearance. This cone or horn, which is placed obliquely upward on the top of the forehead, forming a line with the face, is yellow beneath, black at the tip, and ends in an acute point, which is somewhat bent downward at its summit. No insect resembling it having hitherto been found in this neighborhood, there is but little doubt but that it has lately been imported with or on some foreign plants sent from South America or the West Indies, and as many exotic plants have been received from Balize, British Honduras, it is probable that this grasshopper came in the egg-state, on some of the plants from that locality, and was hatched out last summer in the green-house. This fact alone admonishes us how careful we should be when importing new and valuable plants from abroad, for if a large insect, nearly two inches in length, and fully the size of a katydid, can be so easily introduced, how much more readily the small and inconspicuous noxious insects hidden under the bark would be likely to escape notice, until they had perpetuated their species, so as to become partially naturalized and injurious to our plants. There is no danger, however, that this grasshopper will spread, and, as it is apparently very tender and accustomed to a tropical climate, most probably it would not be able to withstand the rigors of our winters in the open air, and as all were killed or caught as soon as seen in the green-house, there is very little probability of any being left to perpetuate their race.

Mr. Thomas has described this insect under the name of *Copiophora mucronata*, in the Canadian Entomologist for January, 1872, and gives it as his opinion that it approaches nearer *C. cornuta* found at Para, South America, or *C. gracilis*, at Napo or Maranon, than any other species of which he has knowledge.

New earth-worm.—In connection with the subject of introducing new enemies to plants from abroad, it may be advisable to mention that at the present time a very large and apparently new species of earth-worm, thought to have been first introduced in the earth in which some Japanese plants were imported in the expedition under Commodore Perry, has increased and multiplied in the hot-houses so much as to have become a veritable nuisance. This worm is probably the same mentioned in the English Gardener's Chronicle of April 24, 1869, by D. T. Fish, F. R. H. S., under the name of the eel-worm, its habits and appearance being almost identical with that in the hot-houses of the Department of Agriculture. Mr. Fish, after stating that it is very injurious to plants in pots, and had been known for twenty years, says that it is "probably a tropical relation of the common earth-worm, as it cannot live out of doors in the climate of England and scarcely subsists in a green-house, but revels in the temperature of a plant-stove or orchideous house. It differs from the common worm in its mode of locomotion and in several of its habits. It

comes out at night on walls, stone floors, &c., and is as quick as an adder in its movements when disturbed. It seems impossible to eradicate it; it appears to breed with extraordinary rapidity, and is endowed with great muscular power, so much so that it is somewhat difficult to hold a large specimen between the thumb and finger. Lime-water, which is a sovereign remedy against the common earth-worm, appears to have little influence on it, and the only effective mode of destruction is to turn out the soil from the pot and catch and kill the intruder, taking care, however, not to knock or jar the plant, as this worm, instead of coming to the surface on being disturbed, like the common worm, will instantly recede to the center of the ball of earth and remain there undisturbed." In a later number of the Gardener's Chronicle for 1871, page 468, Mr. W. Baird speaks of a worm under the name of *Megascolex* (*Perichæta*) *diffringens*, found in three different gardens in England, in hot-stove houses, which is probably the same worm as the eel-worm referred to by Mr. Fish.

THE COLORADO POTATO-BEETLE.—The reports from Wisconsin indicate that this insect is not so numerous as last year. In Kalamazoo County, Michigan, they have decreased 50 per cent., and other counties send similar reports, though in Wayne County "they have appeared in myriads." In Ohio they are very numerous, as will be seen by the following extracts:

Warren County.—The potato-bug is doing great injury; everybody is catching and killing them, though some rely on Paris green.

Pickaway County.—Injurious to crop.

Wyandotte County.—Plenty.

Franklin County.—Present in countless numbers, but doing little damage. Cool weather prevents their eggs from hatching, while the lady-bugs devour them. Great efforts are being made for the destruction of the pest.

Ross County.—Present in great numbers.

Lucas County.—Numerous; farmers systematically killing them.

Champaign County.—Millions at work on the potatoes.

Delaware County.—Quite troublesome.

The Kentucky reports represent the insect as just making its appearance in several counties:

Shelby County.—The advance guard of the potato-bugs made their appearance May 10.

Spencer County.—Potato-bugs appearing for the first time; never before within twenty miles. (Locusts also plenty.)

Indiana reports are as follows:

Perry County.—Colorado bugs more numerous than last year, but have, as yet, done but little damage.

Lawrence County.—The lady-bug is destroying the eggs of the potato-bug, which is doing but little damage.

Howard County.—Colorado beetles too scarce to do any damage.

Marshall County.—Not half as bad as last year.

Posey County.—Not many bugs yet.

Knox County.—Colorado bugs more numerous than last year.

Wells County.—Has made its appearance within a few days. The only remedy is to destroy them before they deposit their eggs.

Harrison County.—Have again appeared in great numbers, and are likely to destroy most of the crop.

In St. Cair, Montgomery, and Ogle Counties, Illinois, the beetles are "not so numerous as last year." Madison, Putnam, Hancock, and Tazewell Counties report "plenty of bugs." In Massac County "a new

potato-bug, half an inch long, and of a reddish color," has appeared. (Will the correspondent please send specimens?)

Four counties in Missouri report as follows:

Pulaski County.—Potato-bugs very destructive, especially to the Early Rose.

Phelps County.—Potato-bugs numerous.

Perry County.—Bugs in force.

Franklin County.—Not so destructive as last year.

In Kansas the "bugs" have appeared "in diminished numbers."

In Meeker County, Minnesota, the insects have appeared in large numbers, threatening mischief. Will be freely dosed with Paris green.

Upshur County, West Virginia.—Potato-bugs destructive in some places. (This may not be the "western" potato-bug.)

NOTE ON PIERIS RAPÆ.—This insect, the larva of which has been such a terror to the cabbage-growers in the North, has reached the District of Columbia, specimens of the perfect insect, or butterfly, having been taken by Mr. Charles R. Dodge, during the present month, flying about his garden. Its presence was reported in Baltimore last summer.

CHEMICAL MEMORANDA.

BY RYLAND T. BROWN, CHEMIST.

This division of the Department has completed the analysis of the first installment of commercial manures, and while the work of collecting specimens for the further prosecution of this task is progressing, the laboratory is engaged in the analysis of marls, specimens of which have been accumulating for the past year, representing a great variety of substances from different parts of the country. The results obtained from the examination of commercial manures will appear in the forthcoming annual report.

The marls presented for analysis may be arranged in three classes, to wit:

1st. Shell-marls, composed chiefly of marine shells, in a more or less advanced state of decomposition.

2d. Green-sand of the early Tertiary age.

3d. Lime-marls, consisting of calcareous sediments from water holding lime in solution.

Within the next month we hope to be able to present a full report of each of the above classes. At present we are able to give, as an example of the first class, only a single analysis. The specimen was sent by J. P. Dillingham, of New Berne, North Carolina. It may be taken as a fair sample of the "shell-beds" which are common to the Tertiary belt lying between the mountains and the Atlantic coast, and stretching from the Hudson River to Florida.

Analysis of shell-marl, from J. P. Dillingham, New Berne, North Carolina.

Water, determined at 100° C	0.650
Organic matter	2.633
Peroxide of iron and alumina	4.001
Phosphoric acid	0.099
Lime	13.451
Potassa	.331
Carbonic acid	10.600
Silica	68.235
	100.000

THE "POISON SOILS" OF TEXAS.—The Department has received a number of letters from Texas describing a singular phenomenon frequently occuring in the cultivation of the rich prairie soils of that State. With these letters we have received several samples of the soil spoken of, and have devoted much time and attention to a careful examination of them. We make the following extract from a letter written by G. W. Danover, of Breckinridge, Dallas County, Texas:

* * * I send you a specimen of our poison soils. All our soils for many miles in every direction are of the same character, therefore I supposed one specimen would be sufficient. There is no perceptible difference between the poison soil and that which surrounds it. It is distinguished only by the premature decay of vegetation growing upon it. It exists in limited areas, as far as I can learn, throughout the State, in every variety of soil. Sometimes cotton covering 50 acres dies on one plantation. We can never tell where it exists until we plant the ground in cotton, fruit-trees, or root vegetables. The natural grasses, prairie and mesquite, grow well upon it. Timothy and clover are not adapted to this soil and climate. Vegetation that derives most of its vitality from the tap-root is more liable to die than that supported mainly through lateral surface-roots. It does not affect, injuriously, cereals, corn, wheat, &c. * * * Trees usually grow one or two years before dying. Root vegetables and cotton die and rot just before fully developing themselves. * * * The soil is loamy when properly cultivated, but very tenacious when wet. It is underlaid with a thick bed of soft limestone. This is called the "black sticky land." It produces from 25 to 75 bushels of corn, and from one-fourth to one and a half bales of cotton, when not affected by the poison, as we call it. * * * In procuring this specimen I removed the dirt four inches below the surface, then cut a slice ten inches deeper. The difficulty doubtless lies some distance below the surface, from the fact that often one stalk of cotton will die, and another standing almost against it will grow luxuriantly. On examination their roots will be found to be different in structure, the dead one having a straight root and the living one mostly lateral roots.

The specimen of soil sent to the laboratory by Mr. Danover was very dark colored—nearly black—with a slight brown shade, and so hard that it was pulverized with difficulty. A preliminary qualitative examination showed nothing new or unusual in the soil; so the cause of its peculiarity is to be found in the proportions of the ordinary soil ingredients, or in the manner in which they are combined. Subjecting a sample of the soil, well pulverized, to the action of cold distilled water, we found but nine hundredths of one per cent. (.09) soluble. Not fully satisfied with these results, we determined, by an ultimate analysis, to ascertain the exact composition of the soil as the only reliable method of solving the problem. This analysis gave—

Water determined at 100° C.	7.100
Carbonaceous matter and hydroscopic moisture	6.964
Humus, soluble in a solution of carbonate of soda	1.673
Insoluble humus, (extracted by caustic potassa)	0.213
Sesquioxides of iron and alumina	14.096
Phosphoric acid	0.206
Lime	3.166
Alkalies, (potassa and soda)	0.740
Insoluble silica	63.070
Oxide of manganese	2.072
Loss	0.700
	100.000

The first observable features in this analysis are the entire absence of sulphuric acid and the large per cent. of humus which, in the fresh soil, evidently exists as humic acid in combination with lime and the alkalies constituting insoluble humates. This will account for the very small

amount of soluble matter in the soil, and furnish the most plausible explanation of its "poisoning" effect on certain crops.

In a clay sub-soil, charged with water to the point of saturation for at least a portion of the year, the organic matter which it contains will be converted into humic acid instead of undergoing the usual decomposition into carbonic acid, ammonia, and water, which a free exposure to the air will effect. This explains also the fact that crops which draw their nutriment by superficial roots are not unfavorably affected in these spots. By exposure to atmospheric influences the surface-soil loses its humic acid by conversion into soluble humus.

What this soil needs is, 1st. A thorough underdrainage, which will relieve the sub-soil from saturation during the rainy months and permit the air to circulate through it freely at all times; and 2d. After the sub-soil is relieved from saturation it should be broken deeply so as to bring it more fully under the influence of the air. Sub-soiling, however, will be of no value unless there is first a good underdrainage; for the rain, saturating the sub-soil, will run it into a mass as compact and as impervious to the air as it was before it was broken. The soil contains a high per cent. of lime, but there is scarcely a trace of it in the sub-soil in a soluble form. A heavy dressing of quick-lime, plowed in deeply, would evidently take up a large amount of humic acid, and thus relieve other elements of plant food which are now locked up as insoluble humates. But, without underdrainage, this effect will only be temporary; indeed, the action of lime on a saturated sub-soil tends ultimately to render it more compact and impervious. The use of gypsum will improve this soil by supplying sulphuric acid, an element in which it is entirely lacking.

We would, therefore, recommend for these "poison soils," 1st. A thorough underdrainage; 2d. Deep sub-soil breaking; 3d. The application of quick-lime and gypsum in liberal quantities.

Beet-sugar.—The problem of furnishing sugar to supply the large and constantly increasing demand for it throughout the civilized world is daily augmenting in importance. Sugar, in some of its forms, is widely distributed throughout the vegetable world, and though it is seldom found in chemical combination with other substances, yet it is generally so mixed with a number of other proximate principles that its separation in a crystallizable form is very difficult.

When it is ascertained that the juice of the sugar-beet contains from 10 to 13 per cent. of crystallizable sugar, and that the beet can be produced in unlimited quantities, most persons will suppose that the sugar problem is solved. But beet-juice, in addition to sugar, holds in solution pectose, gum, albumen, asparagin, betain, oxalic acid, citric acid, phosphoric acid, sulphuric acid, chlorine, and silica. Besides these there are variable proportions of potassa, soda, lime, iron, magnesia, rubidium, and manganese, from all, or the greater portion of which, the sugar must be separated before it is fit for domestic purposes. Most of these substances, as compared with the sugar, are present in very minute proportions, yet these and their chemical derivations defeat all attempts to procure the sugar by evaporation merely. The efforts to manufacture sugar from beets or sorghum in this country have failed just at this point; and even in Europe, where the beet-sugar enterprise has been most successful, this question of defecation is far from being satisfactorily settled.

The albumen will coagulate when heated to 180° F., and in its coagulation it will entangle and carry with it many of the less soluble organic substances; and with this view, an additional amount of albumen, in the form of eggs or milk, is frequently added. If the juice be

exposed to the air any considerable length of time before it is heated, the albumen and other nitrogenous substances will begin to evolve ammonia, the presence of which interferes materially with the crystallization of sugar. But suppose the albumen has been promptly coagulated and the defecation has removed such substances as pectose, gums, &c., yet there remains in solution the acids which tend constantly to convert crystallizable sugar into glucose, which is practically uncrystallizable. It is an urgent necessity that these should be neutralized as soon as possible. Caustic lime is commonly used for this purpose; but in the presence of bases, sugar plays the part of an acid, and enters readily into combination with these. This compound with lime has a bitter taste, and is very soluble in cold water. Its solution, however, if tolerably concentrated, becomes opaque when heated, and presents an appearance of coagulation, resembling that of white of egg. (Miller.) In the presence of this peculiar substance the crystallization of sugar is interfered with, and thus the loss is much more than that taken up by the lime. In this state the compound of sugar and lime may be removed by bone-black, but still the loss of sugar is considerable. Another effect is produced by the use of caustic lime. Potassa and soda exist in the beet juice in the form of carbonates, but the presence of lime immediately reduces them to the caustic form, and they take up sugar to supply the place of carbonic acid which they have lost. The proportion of these alkalies in the beet is very small, it is true, but the loss of sugar in this direction adds its mite to other losses until the aggregate interferes seriously with the profits of the manufacture. Even in the most successful establishments in Europe, 75 per cent. of the sugar actually contained in the beet is rarely obtained in a crystallizable form.

In the very interesting experiments of Professor Goessmann, of the Massachusetts Agricultural College, we have an attempt to obviate most of these difficulties on purely scientific principles; and, we are happy to say, with results which bid fair to lead to ultimate and complete success. Fifty pounds of the freshly expressed juice of the electoral beet was brought rapidly up to a temperature near the boiling point, (80° C.,) when the source of heat was withdrawn and one-half of 1 per cent. (4 ounces) of caustic lime, reduced to the condition of milk of lime, was stirred into the juice. The heat was then raised fully to the boiling point, when it was again removed, and after standing fifteen minutes, the clear juice was drawn off by means of a syphon. Several advantages are gained by heating the juice before adding the lime; the chief of which are the more perfect coagulation of the albumen and the consequent separation of the organic substances which it carries with it; the more perfect neutralization of the citric, oxalic, and phosphoric acids, and the precipitation of the insoluble salts thus formed. The asparagin present in the juice is rapidly converted, by the action of caustic lime, into asparaganic acid and ammonia. The acid combines with lime and is thus disposed of, and the ammonia escapes in the gaseous form, being insoluble in hot water. These are important advantages gained by hot defecation.

After this the clear juice was concentrated by evaporation to 30° Brinx, and when cooled to 125° F. (50° C.) it was treated with carbonic acid, which had the effect to liberate the lime from its combination with sugar, and precipitate it as calcic carbonate. The clear juice, heated to near the boiling point, was passed through a filter of bone-black, and by careful evaporation was crystallized. By the use of carbonic acid the greater portion of the sugar which has entered into combination with lime, potassa, and soda may be recovered.

By this process from 8 to 9.4 per cent. of crystallized sugar was obtained from juice holding in solution not exceeding 13 per cent. These results are certainly very encouraging.

These successful experiments are the first fruits of our system of agricultural colleges, and indicate very clearly an important feature in their mission.

We commend the report of Professor Goessmann to the attention of all who wish to investigate the beet-sugar question. The ultimate success of this enterprise in our country is suspended chiefly on the chemical questions involved in separation and crystallization of the sugar, and that these will ultimately meet a favorable solution at the hand of science, no longer admits of a rational doubt. The high price of labor in this country, which is frequently urged as being fatal to the enterprise, is fully offset by the price of sugar here as compared with the European market. Add to this the fact that in Germany and France the beet crop pays from $40 to $50 per acre tax to the government, and the preponderance will be fairly on our side.

BOTANICAL NOTES.

BY GEORGE VASEY, BOTANIST.

LIATRIS ODORATISSIMA, *Willd.*—This plant, which is a native of the Southern States, has been the subject of some recent inquiries. It grows in low, sandy woods from Southern Virginia to Florida. It is known by several local names, as wild vanilla, deer's-tongue, and sea lavender. The leaves have a strong vanilla odor. The plant grows three to four feet high, with a simple straight stalk, terminated by a corymb of bright purple flowers. It belongs to a genus which is represented by eighteen or twenty species in the Southern States, none of which are specially odorous except this one. Several species are found in the Northern, and several in the Western States. They all have showy purple flowers, some of them in long spikes, and are known by several local names, as button snake root, blazing star, &c. The leaves of the first-mentioned species (*L. odoratissima*) have been employed to give a pleasant fragrance to tobacco and cigars. They are brought to market in small bales. The lower leaves of the plant are about six inches long by three inches broad. It is said to be very abundant in Florida. We are not informed as to the market price of the leaves, but do not doubt that it depends much upon their mode of cure and their soundness. For wrappers of cigars the leaves would need to be sound and unbroken.

Probably if the plant were submitted to cultivation, and the stalk cut back so as to favor the development of large leaves, it might be improved in quality and value. We would be glad to see its use extended, for it has no hurtful properties, and since it improves the flavor of tobacco, the more of it employed in the manufacture of that article the better.

SHADE AND ORNAMENTAL TREES.—We have yet much to learn, or perhaps we should say much to practice, with regard to suitable shade and ornamental trees in cities. In some instances it seems to have been the rule to plant anything that could be easily procured, particularly if recommended as a rapid-growing tree. Hence so many of our streets have been overrun with the ailantus, so sadly misnamed the "tree of heaven." Its very disagreeable odor at flowering time has caused a raid which threatens to result in its extermination. The next raid will

probably be upon the white poplar, or cotton-tree, (*Populus alba, L.*) When its seed pods are matured there is a period of eight or ten days during which the air is filled with the cottony down of the seeds, causing much annoyance. Still, this tree has many good qualities, and we hope it will be left at least until better trees can be reared.

The locust (*Robinia pseudacacia*) has almost disappeared from cultivation at the North by reason of the ravages of the borer. The silver maple is desirable for its rapid growth and beautiful silvery leaves, but in some locality it has been sadly injured by a borer, which has caused the death of many trees. Its long slender branches render it particularly liable to injury from storms of sleet. No native tree we have is better adapted to the purposes of shade and ornament than the sugar maple. Its foliage is full and dense, and its form is that of a rounded cone of beautiful proportions. It is also clean and free from insect enemies. It would be well if, in planting shade-trees on our streets, there could be a suitable alternation of different kinds, some of rapid growth for temporary use, and others for permanence. Some attention should also be paid to variety. Probably the very best trees for general street-planting are the different varieties of the maple. Next in value we would place the elms. For intermediate and temporary planting the box-elder and the ash may be mentioned. Here and there should be the bass-wood, or linn, the tulip-tree, the horse-chestnut, and the buckeye. The sycamore and catalpa are too open and straggling in their habit to be valuable for shade, but give an agreeable variety to a park. The conditions of latitude and temperature will also modify the selection of suitable varieties.

VEGETATION IN WESTERN KANSAS.—We have been furnished with several specimens of young grain plants, and of lucerne, from some points in the extreme west of Kansas, which compare very favorably in thrift and size with the same plants in the Atlantic States at the same period of growth.

Mr. R. S. Elliott, industrial agent of the Kansas Pacific Railroad, writes:

> There is no room for doubt that if ground were broken at Fort Wallace an immense amount of forage could be raised without irrigation. I shall, this year, give sorghum, millet, and Hungarian grass a better test than I was able to give them last year. I expect also to plant a plat of Indian corn. All my operations are without irrigation. In the valley of the Smoky, below Fort Wallace, a large body of land can be irrigated, and quite extensive gardens are being prepared by direction of the officers; but I hold that a large supply can be grown of rye, sorghum, corn-fodder, and perhaps corn, &c., on the upland north of the fort, without irrigation.

GRASSES FOR FIXING A SHIFTING SOIL.—Several inquiries have recently been made for a kind of grass adapted to growth on the sandy borders of our lakes, and the ocean, for the purpose of fixing the shifting sandy soil. Several kinds of long-rooted, deeply penetrating grasses seem to be well adapted to that purpose. On the shores of Lake Michigan the long-leaved Calamagrostis (*C. longifolia*, Hooker) takes possession of the sandy ridges, in connection with several species of low willows, and makes a permanent barrier against the encroaching waves. The sand-reed (*Calamagrost is arenaria*, Roth.) occurs on low, marshy borders, not only of the great lakes, but also of the ocean coast, both in this country and in Europe. Indeed, in some instances the planting and preservation of this grass have been provided for by law. The roots are very tough, and are used for making brushes and brooms, and the leaves are used for thatching, for mats, and for paper. For forage this grass is valueless, being rejected by all kinds of animals.

This subject has excited attention in Europe, as will be seen by the following extracts from an article on "The Caspian willow and buffalo-grass as a means of fixing blowing sand," recently published in the "*Landwirthschaftliches Centralblatt für Deutschland.*"

The Caspian willow has been recommended lately for fixing blowing sand. This species, however, does not come from the Caspian Sea, as one might conclude from the name, for we have never seen it there, at least on the western side; but it grows without doubt all over the Empire of Russia, and even to the interior of Siberia. Possibly its home is the sandy wastes of Southern Siberia, and from thence it came to us by way of Astrachan. At any rate we have received it through Poland. The introduction of home plants from foreign countries on account of their utility is not a new thing. The meadow-grass (*Phleum pratense*) was taken from England to North America, and there discovered to be a good fodder-plant. Englishmen found it cultivated, and took the seed back to Europe, where ever since it has been highly esteemed under its North American name. The Caspian willow is probably a small-leaved variety of another species, which has been found in Pomerania by Wildenow, and received the name of *Salix pommeranica*, but which is not different from the Linnean *Salix daphnoides*. Many, however—among them Wildenow—consider it as a distinctive species under the name of *acutifolia*. Besides the smaller leaves, green on the under surface, it grows more rapidly on sandy ground, does not soon become a tree, and has slender hanging branches. As a binding plant, *S. acutifolia* has the preference over the ordinary *S. daphnoides*. *S. acutifolia* also has the merit of having its branches covered with a purplish bloom, and thus giving a charm to the landscape when seen against a dark background of evergreens. It also unites well with the red twigs of *Cornus alba* of Siberia. We can also recommend *S. longifolia*, Host., (commonly catalogued as *S. dasyclados*, Winun,) to protect sandy shores. We saw it grow luxuriantly on a sandy field belonging to the Flottbecker school of forests. The shoots attained a length of six to eight feet, and made good withes in winter, which were used in place of those that previously had to be purchased at a high price.

A grass has recently been brought into notice for the purpose of fixing sandy soil, which is widely distributed through North America, from Canada to Texas, and furnishes food for the buffaloes or bisons. From this fact it has acquired the name of buffalo-grass, but is known scientifically as *Buchloe dactyloides*. This grass makes long runners, and consequently covers the ground rapidly. It is very nutritious, which adds to its value, and if it will grow as well with us as it appears to in New Holland, we shall have a fodder-plant of more value than lupines: just the thing for the barren sands of the Mark and other northern districts.

In our own country several native species of willow will undoubtedly be found adapted to the same purpose—for instance, *Salix tristis*, *S. petiolaris*, *S. cordata*, and particularly the *Salix adenophylla*, Hook., recently detected on the sandy shores of Lake Michigan, where it flourishes on the ridges of pure sand thrown up by the waves. There is probably a mistake with reference to the buffalo-grass named in the quotation. If it really be the *Buchlöe dactyloides* the statement is of much interest. It would be singular if this grass, which has been entirely neglected here, should be tested and found valuable abroad, and then come back to us as a claimant upon our gratitude and favor. It possesses an important advantage over the coarse *Calamagrostis* in its valuable grazing properties. In California the giantlyme-grass, *Elymus condensatus*, is said to do excellent service in fixing the soil on the banks of rivers and creeks.

In connection with this subject, we may notice that attention is being directed to the grasses best adapted for cultivation in the South and Southwest, particularly on sandy lands. Mr. F. W. Robbins, Matagorda, Texas, in acknowledging the receipt of a package of rye-grass seed, inclosed a stalk of grass, which he says is not found on the fresh land, but is taking the place of other grass on sandy land where the sheep have pastured and manured. He wishes to know whether it is a good grass or not. The specimen sent is a species of *Agrostis*, (*A. verticillata*, Vill.,) a grass which is found in Texas, New Mexico, and California, as well as in some parts of the Old World. It is perennial, and

although hitherto neglected agriculturally, may be found of value in some situations.

Another correspondent sends specimens of a grass which he says grows freely on the poor land of a neighboring farmer. It is the *Festuca tenella*, which is notorious for its growth on dry, thin soils, and the more of it a farmer has the poorer he will be.

Mr. J. M. Morehead, Greensborough, North Carolina, writes to inquire the botanical name of a grass found in a few places in that and adjoining counties, where it is known by the name of mountain-grass. It is the tall oat-grass, *Arrhenatherum avenaceum*, and is well known on the continent of Europe as a valuable agricultural grass. Mr. Morehead says it is "the earliest of all our grasses, is admirably adapted to pasturing, withstands the freezes of winter and drought of summer well, and it is almost impossible to kill it out by continual pasturing. With the exception of clover, it is the very best grass for this section of country. It yields annually two or three excellent crops of hay."

MICROSCOPIC INVESTIGATION.

PEAR-TREE BLIGHT.

By Thomas Taylor, Microscopist.

"For nearly a hundred years, blight of the pear has been a terror and despair to growers of its fruit." This disease is known under a variety of names—winter or frozen sap blight, leaf blight, summer blight, &c. It is quite different from insect blight. Its true character is, doubtless, of fungoid origin. Since the temperature and hygrometric state of the atmosphere and the conditions of the soil, whether acid or alkaline, pulverent or stiff, affect fungi by either retarding or fostering their growth, it becomes a matter of interest to ascertain how far observations made in relation to pear-tree blight will agree with the fungus theory.

Some forms of fungus are favored by heat and dryness, such as the oidium of the European grape-vine, while the fungus of the native grape-vine is favored in growth by moisture and heat. The first may be called a saccharine and the second an acid fungus, being favored by the acid condition of the leaf and wood.

Yeast, which is a fungus of a low order, when in its active state always exhibits an acid reaction; if well washed, the globules become much less active; but by exposure for a few hours to the air their activity is restored, the acidity being thereby again developed. The addition of a small quantity of vegetable acids, such as acetic or tartaric, to washed yeast immediately restores its activity, but when a larger quantity of acid is employed the process of spore-budding is arrested. The mineral acids, such as sulphuric, even in small quantities, immediately stop yeast fermentation; sulphurous acid acts in like manner. A small quantity of free alkali, or a strong solution of common salt, also prevents its fermentation. Nitrate of silver, corrosive sublimate, and sulphate or acetate of copper checks its growth immediately on application; also oxide of manganese, oxide of mercury, strychnia, small quantities of kreosote, oil of turpentine, and many other essential oils. When, however, the low forms of fungi once commence, the vegetable

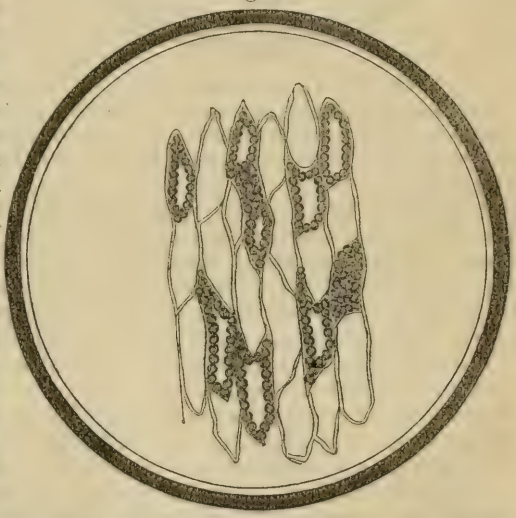
bases have no power of arresting although they may retard their progress. Boiling-water, also, for a time arrests the progress of fungi. A knowledge of the habits of fungi and of the substances and conditions which retard or foster their growth will, to some extent, enable fruit-growers to modify fungus blight. But independent of all chemical appliances, drainage, and sheltering by belts of timber or hedges, would be of great importance, when the land or orchard is devoid of natural sources of protection. It is not simply to the conditions of high or low temperatures, or to the hygrometric state of the weather that blight, rust, molds, &c., owe their origin, but to a combination of many conditions. Heavy rains on well-drained soil will not present the same conditions to vegetable growth which they would on poorly drained. A favorable condition of soil and climate is required by foliage of spring, summer, and autumn, for a healthy performance of its functions. Under highly favorable conditions of climate and soil the wood becomes matured and, consequently, the fruit and the leaves drop when, and only when, the uses for which they were formed have been accomplished. The wood of every tree when fully matured has condensed the sap, forming it into wood or other solid material; consequently, the cells under such conditions are comparatively empty, and have room for the expansion of any limited portions of sap remaining. Climatic derangement in the animal as well as in the vegetable economy is frequently produced from sudden changes of temperature. A mantle of ice, or of snow, will not necessarily prove hurtful to plant-life; flowers are sometimes found blooming under snow. It is from the unprepared condition of plants and trees that injury from frost mostly spring. It is not unusual for a shepherd on the mountains of Scotland, while tending his sheep to save them from perishing in snow-drifts, to immerse his plaid in a brook, wring it out, and wrap it round himself. It freezes, and ice being a non-conductor of heat, he is kept warm in his frozen mantle. The Laplander lives in huts of ice or snow to shield himself and family from the bleak winds of winter. Ice, snow, and water, are classed as non-conductors. It is when water is converted into vapor that the body from which it evaporates becomes cold. Millions of pounds of paraffine have been for a long period annually extracted from coal-oil by taking advantage of this principle; by the evaporation of ether in contact with a vessel containing coal-oil the paraffine freezes solid in the oil and is thereby easily removed. But it is not the cold, properly considered, which produces the disease owing to the bursting of plant-cells but to the stoppage of the functions of assimilation in the presence of myriads of germs of fungi and infusorial life. Healthy plants will decompose any foreign substance suitable as food and assimilate it in the support of their own function.

"Fungi consists of two principal elements, the vegetative and the fructifying. If we take, for example, the common mushroom, the vegetative is represented by the spawn which, for a time, carries on all existing functions of the plant; the fructifying by the stem, with the cap and gills which bear nearly the same relation to the spawn as the flower with its various organs to the stem on which it grows. The spawn may flourish for years without bearing any fruit, but fruit can never be produced without spawn."

The spawn of fungi, whether in a cellular or fillamentous condition, undergoes an infinite variety of modifications; it is developed in various situations, and even when present beyond a doubt among the tissues of plants, at whose expense it lives, is very difficult to detect, in consequence of its extremely minute condition.

In entering upon an investigation of this kind, it is necessary, sometimes, to experiment with suspected wood fibers taken from living or dead organic matters, with a view of developing to a higher state of growth the dormant germs. Some of the means employed consist in subjecting suspected specimens to a favorable temperature and moisture, and suitable food; in this way, sometimes, forms will be exhibited after the lapse of a suitable period, by which means the true character of the fungi is known. In examining pear-tree blight, I have taken advantage of such means to ascertain the presence of fungi in suspected portions of an affected pear-tree. I removed several portions of the bark from various points of the tree, and examined them with an object-glass of about one inch, which for this purpose may be considered a low power, but no well-defined forms of mycelium (spawn) were visible. I next placed specimens of the healthy bark and the blighted in separate vessels of water, to be macerated; in about eight days the blighted portions indicated the separation of the last cambium layer from the liber, which appeared as a translucent membrane, the largest portions of which were not over one-tenth of an inch, and did not exceed one-hundredth of an inch in thickness. When a portion of the flocculent matter was placed under an object-glass of about 250 diameters, its cellular structure was seen, well defined, and numerous dark-brown spores bounded most of the cell walls. [See Fig. 1.] In some cases the cells exhibited nothing but dark masses of brown gelatinous matter, but when subjected to pressure and friction they were found to be masses of spores, all of the same class and color. The healthy bark did not exhibit any spores under the same conditions. Fig. 1 represents the general appearance of the cellular matter, spores of the blighted bark in their arrangement, form, and depth of color. I treated blighted pear-tree leaves in a similar manner.

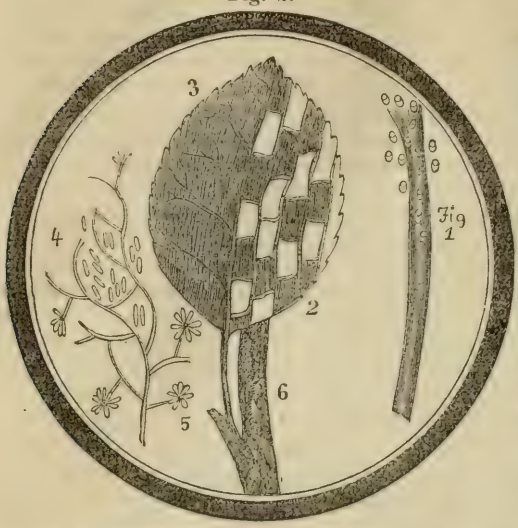
Fig. 1.



On removing a portion of their epidermis to glass microscopic slides, by means of a knife, well-defined elliptical double-celled spores were seen, perfectly developed, under a one-eighth power. Fig. 2 represents the spores on a portion of a leaf-rib, all highly magnified. The cellular structure of the leaf, when viewed under a high power, appeared as at 2. About one-half of the cells were filled with a dark-brown opaque substance, the other half being highly transparent, while 3 shows the appearance of the leaf blackened from internal disorganizations, and 4 represents a single stratum of mycelium which appeared on leaves that had been only partially submerged in water. It had a very fine silken appearance. From its great delicacy it could not be removed from its position, without injury, by any of the ordinary modes, as with a point; and in case spores were present their true positions could not be seen. To overcome this difficulty I prepared a very limpid solution

of copal varnish, by combining one ounce of copal with ten of benzine, a portion of which I poured on a glass slide one inch by three, instantly allowing all the superfluous varnish to drain off. In about thirty minutes after this operation the mildewed leaf was pressed gently on the varnished glass, when the mycelium was transferred to it, owing to the slightly sticky character of the varnish. When mounted in the usual manner they may be photographed. The threads of the mycelium are not more than about the twenty-thousandth of an inch in diameter; from these short threads protrude, on the terminals of which grow bundles of naked spores, arranged as shown.

Fig. 2.



In my investigations of pear-tree blight, I have failed to discover any fungi inhabiting those portions of blighted bark which seem deficient of albuminous matter. The myceliums when once formed, will doubtless spread over substances foreign to them as food; but the protoplasmic portions seem only to foster there the germination of fungi.

There may be periodic times when fruit-trees and cereals will attain great perfection in growth, and appear wholly free from external fungoid disease, notwithstanding the soil, either mechanically or chemically considered, is not of the most favorable character. Such appearances may lead to an extension of fruit-tree planting on such soil; but with a single unfavorable season the fruit-grower's hopes may perish with his trees and labors. Fungi seem ever present, waiting in undeveloped forms their time for action.

Some interesting experiments are being prosecuted by Mr. William Saunders, superintendent of the Department grounds, in relation to pear-tree blight, particularly during the last two years. A pear-tree which was badly blighted on its main trunk was made the subject of special experiment. Nearly all of the bark was blighted within three feet of the ground, only about an inch and a half in width being left to connect the upper part of the tree with the unblighted bark at the base. The affected part was removed and the sap-wood left quite exposed to view; but to prevent injury from the air it was at once coated with a composition of carbolic acid, sulphur, and lime, and largely diluted with water. After the lapse of two years the tree has wholly recovered and the denuded part is again covered with new and healthy bark. The tree in all respects presents a healthy appearance. Many other trees much affected with blight were coated heavily with the sulphur compositions and have evinced marked signs of improvement. It is intended to continue these experiments on a larger scale, until sufficiently numerous and well-established facts attest the best mode of treatment. The Department grounds consist of a heavy, compact, partially undrained

soil, lying low; they are therefore unfavorable for the highest development of pear-tree culture. It has been only by persistent effort that the fruit-trees on the Department grounds have been brought to their present highly improved state.

Barry, on fruit-gardening, says, page 361, that "Blight has never been known to originate on the dry, sandy loam of Long Island, not even with heavy manuring, the drought of mid-summer always ripening the shoots so completely that the leaves drop off long before frost commences." The true source of blight seems to have its origin principally in the action of frost on unripe wood, which may arise from a combination of causes.

The exact conditions of growth, or degree of maturity most favorable to the development of the pear-tree blight or fungi, will form the subject of further investigations, with a view to assist the practical cultivator to counteract, if possible, this troublesome and so frequently fatal disease.

SCIENTIFIC NOTES.

INTERNATIONAL COUNCIL ON THE CATTLE PLAGUE.—Dr. Bouley, an eminent physiologist and veterinarian, who has given special attention to the cattle-plague, has lately made a very important report to the Academy of Sciences of Paris, of the proceedings of the International Sanitary Convention, held March 16 of the present year at Vienna. This had for its special object the determination of the best methods of preventing the cattle-plague, and the taking into consideration the question of establishing proper sanitary regulations in regard to the cattle-traffic between the countries represented in the convention. Delegates were present from eleven states at the convention, namely, Germany, Austro-Hungary, Belgium, France, Great Britain, Italy, the Roumanian Principalities, Russia, Servia, Switzerland, and Turkey.

The delegates included in their number some of the best veterinarians of their respective countries, as also various officers specially charged with the enforcement of sanitary regulations. The questions before the convention, which, by previous notification, they were expected to discuss, were sixty-five, to which a few were added after the sessions commenced. It is a remarkable circumstance, however, that the conclusions arrived at in regard to the regulation of the cattle disease met with almost unanimous approval. This accord was largely due to the fact that there is at present but little contrariety of opinion as to the exotic nature of the disease (at least in regard to Western and Central Europe) and as to its mode of propagation. It was well established in the convention that, outside of Russia, it never develops spontaneously upon any race of cattle, not even that of the steppes; and consequently that, whenever it shows itself outside of its native home, it may be considered as imported.

It is also well established that even after it has continued for a longer or shorter time in any given country, it is only transmitted by contagion, and that it always becomes extinct when the conditions favorable to its propagation cease to exist. The idea, therefore, that the cattle-plague is an epidemic may as well be at once dismissed from every mind. If, however, it is certain that this disease never develops itself spontaneously, beyond the frontiers of Russia, the question still arises as to which of the provinces of that country it properly belongs. This question also

occupied, to a great extent, the attention of the convention, as influencing very largely the rules that were to be adopted.

It is probably in the neighborhood of the Asiatic dependencies of Russia that the evil has its home; but as the precise district has not yet been satisfactorily ascertained, and as the movements of cattle from the Ural Mountains toward the western portion of the Empire very frequently disseminated the contagion in the countries they traversed, it was considered expedient by the convention to leave Russia entirely out of the sanitary agreement, and not to permit the exportation of its cattle except upon certain well-established guarantees.

The subject of inoculation, as a preventive, in Russia, was carefully discussed by the convention; but finally it was concluded that the experiments hitherto made were scarcely sufficient to show a definite measure of beneficial results, and it was agreed that, whatever individual cattle-owners in Russia might prefer to do in the matter, it was not expedient to press upon the governments the enactment of laws on the subject. As to the application of the method to animals of Central and Western Europe, the convention repudiated the idea entirely. The numerous experiments showed that very little impression is made upon the mortality that would naturally have ensued from the disease without such treatment.

As to the general question of absolutely preventing the importation of cattle from Russia, it was found very easy so far as Germany was concerned; but very difficult for Austria and Hungary, owing to the great extent of the coterminous boundaries of the two countries, and the dependence of Austria upon Russia for this source of food. It was, therefore, recommended that a careful supervision should be exercised, and that cattle, after crossing the frontier, should be subjected to quarantine of ten days before resuming their journey.

The question being thus settled in regard to the importation of animals from Russia into Austria, the next point that came up for consideration was the nature of the conditions that the several governments should impose upon themselves toward doing their share to prevent the introduction or spread of the disease; and the measures concluded on as most essential were: first, the immediate slaughtering of all animals that had come in contact with the plague, as also of those which might be considered as under suspicion of having the disease, in consequence of the influences to which they had been exposed, this being accompanied by a proper compensation to the owners; secondly, the burial of the dead bodies of all animals affected with the plague, without attempting to utilize them in any way whatever; thirdly, the utilization of the flesh of sound animals killed under suspicion, but proved after death to have been healthy, this to be permitted only under special conditions rigorously determined; fourthly, the destruction of the germs of the contagion wherever they can be found, in the slaughter-houses, on harness, in pastures, in railway trains, &c., as also the disinfection of all objects with which they have been brought in contact; fifthly, isolation, as complete as possible, of the places where the plague has been found to exist, so that no animal believed to be capable of carrying the contagion or of receiving it shall be allowed to enter the infected districts, this isolation to be put in practice on farms and all other localities, and to be of greater or less extent, according to the extension of the disease; sixthly, the establishment around the places in which the isolation has been ordered, and which have been declared infected, of a zone where the movements of cattle are forbidden, as well as all commerce in anything that may serve as a vehicle of the contagion, such as fodder, dung,

and animal products and materials of every kind; seventhly, the suspension of fairs and movements of cattle in the infected locality and the suspected zone, so that the authorities may have a guarantee that animals have not been moved by clandestine traffic from the place which they originally occupied; eighthly, as soon as a case of plague has been officially established in any locality, an immediate declaration is to be made of every new case, as soon as known, by the keepers of animals; ninthly, after the disappearance of the disease from the localities, suitable precautions and methods of disinfection are to be prescribed preliminary to the re-stocking of the stables and pastures, and the re-establishment of the liberty of trade in cattle.

In all these various measures there is really nothing new. They have heretofore commended themselves to the judgment of those who have had to deal with the subject. Another, however, of great importance in a commercial and sanitary point of view, was added, namely, the requirement that every State in which the cattle disease manifests itself shall make announcement of the fact immediately, by telegraph, first to the neighboring governments, and ultimately to those more distant. A careful inquiry is to be made as to the route of introduction and propagation of the disease, and the results are to be, with the least possible delay, brought to the knowledge of the authorities of all the countries menaced by the invasion of the plague. Wherever the disease has actually broken out in a country, it is to publish in an official journal, a weekly bulletin showing the stage of the disease, the measures adopted for its prevention, the successive modifications of regulations which are to be introduced according to circumstances, and, finally, the day in which they cease to be in operation; this bulletin to be sent to the editors of official journals of other States when they desire it.

The convention found that, among the various countries that had had occasion to take measures for the proper disinfection of cattle-cars and other vehicles of transportation, Germany had the most satisfactory arrangements. Here, after a train has been emptied of its contents, the cars are immediately deluged with warm water of at least 160° F. The shock and strength of the current, falling from a considerable elevation, detaches all organic material adhering to the wood-work, and, by the elevation of temperature, annihilates all virulent activity.

The principal point established by the convention, according to Bouley, was the necessity of an obligation to slaughter all animals as soon as the disease made itself manifest, or as soon as there seemed a probability that an animal would be attacked. In this way the plague will be arrested by sacrifice of the smallest number of animals.

Source of nitrogen in the soil.—According to Deherain, the sources of the nitrogen of the soil, as at present recognized, are insufficient to account for the amount of nitrogen which the soils contain, and he tries to prove, by certain experiments, that the free nitrogen of the atmosphere is brought into combination during the oxidation of the organic matter of the soil.

Cure of enteritis in horses.—Dr. Mooer, a veterinary surgeon in London, has, it is said, been very successful in curing enteritis in the horse, by administering morphia in conjunction with chloroform. He first introduces a full dose of morphia subcutaneously, and if the severe and violent pain is not relieved in a few hours, he casts the horse and administers chloroform by inhalation. He has succeeded in producing profound, unbroken sleep in seven or eight hours, by the use of one ounce of chloroform, the patient waking at the end of that time quite convalescent.

MICROSCOPIC FORMS IN CHICAGO WATER.—Mr. Babcock, of Chicago, has contributed an interesting article to the "Lens," upon the effect on the hydrant water of the reversal of the current of the Chicago River. It is well known that during the past year an engineering enterprise of much magnitude, initiated some time since, was completed, namely, the connecting of the Chicago River with a tributary of the Mississippi, by which its stagnant waters were carried southward toward the Gulf of Mexico, and their place supplied by a continuous stream of pure water from the lake.

One desired effect of this enterprise, namely, an improved sanitary condition of Chicago, was speedily accomplished; and not only did the effluvium from the river measurably diminish, but the hydrant-water has been greatly improved in purity. The shaft through which water is admitted to the tunnel from the water-works is situated in the lake, some two miles from the shore, and although so far removed from the drainage of the city, more or less of impurity continually found its way into its mouth. This was proved both by chemical and microscopical examinations, numerous forms of infusorial objects, such as diatoms, vegetable and animal germs, &c., being readily discernible. Somewhat to the inconvenience of microscopists, the new arrangement has tended to reduce the number of such objects very materially, so that the water sometimes scarcely repays the labor of searching for microscopical material.

Mr. Babcock is inclined to believe that so long as a moderately rapid current is kept up in the Chicago River from the lake, the city will be provided with water nearly equal in purity to that at Mackinaw, which has become proverbial for its excellence.

PECULIARITIES OF THE PAST WINTER IN EUROPE.—The past winter has been a very remarkable one in England. The cold weather set in unusually early and severely with the commencement of November, and from that date to December 13, Mr. Glaisher's weekly tables of meteorological observations, taken at Greenwich, show the temperature to have been uniformly below the mean of the last fifty years, with the break of only a single day, the mean depression for the whole period being 6° 5′ Fahrenheit. The coldest day was December 8, when the thermometer fell to 18° 6′ Fahrenheit, and the temperature of the twenty-four hours was 19° 3′ below the mean. Throughout France the month of November was very severe, the mean temperature of the month having been lower only four times during the last century. According to statistics presented to the Academy of Science by M. Ch. Sainte-Claire Deville, the thermometer fell as low as 11° Fahrenheit at Montargis on December 3, while even at Marseilles the remarkably low temperature (for that locality) of 27° 5′ Fahrenheit is recorded on November 23. During the early part of December the frost continued still more severe in France and Italy, where much snow fell. At Rome and throughout France trees and shrubs which had survived many winters were entirely destroyed. M. Delaunay remarks that the cold advanced, as is usually the case, from northeast to southwest. The minimum temperatures were recorded at Groningen, in Holland, on December 7, 14° Fahrenheit; at Brussels, 9° 5′ Fahrenheit on the 8th; and at Paris, 6° Fahrenheit on the 9th. This extremely low temperature appears to have been confined to a very limited tract of country between Paris and Charleville. On the same day the temperature was above the freezing point in Scotland, within reach of the influence of the Gulf stream, as far north as Nairn, and in the greater part of Eng-

land, falling only at Greenwich as low as 28° Fahrenheit. This severe frost was followed in England by a period of exceptionally mild weather of probably unprecedented length. For ninety-seven days, from December 13 to March 18, Mr. Glaisher's tables show that the temperature was above the average on eighty-nine, and below the average on only eight days, the mean excess for the whole period being 5° 1 Fahrenheit. During the whole of this period of more than three months the thermometer fell below the freezing point on four nights only, February being entirely free from frost. The warmest period was from March 1 to 8, when the maximum temperature ranged each day from 57° 1′ to 60° 8′.

On March 19, the temperature again fell below the mean, and continued so for nine days, till the 27th, accompanied in London and the neighborhood by heavy falls of snow. The minimum temperature for March was, on the 21st, 26° 2′, being the lowest recorded since December 9. There were nine frosty nights in March, against two in the whole of the two preceding months. For the week ending March 26, the mean temperature was 34° Fahrenheit, or 16° lower than the mean for the week ending March 7. The severe frost of March 21, following such a long period of mild weather, has done an immense amount of damage to the fruit crops, the pears and cherries having suffered more severely. It is remarkable that, although the flowers were killed in the bud, the center being turned perfectly black, they opened as if untouched, and presented a mass of bloom looking to the eye entirely uninjured. On the early vegetable the effects were no less disastrous. In the island of Jersey alone, whence large supplies are usually obtained for the London market, the damage to the potato crop is estimated at many thousands of pounds.

Influence of variously colored light on vegetation.—As the result of a series of experiments upon the influence of variously colored light upon vegetation, Dr. Bert has arrived at the following conclusions: 1. That green light is almost as fatal to vegetation as darkness. 2. That red light is very detrimental to plants, though in a less degree than green light. 3. That though yellow light is far less detrimental than the preceding, it is more injurious than blue light. 4. That all the colors taken singly are injurious to plants, and that their union in the proportion to form white light is necessary for healthy growth.

The author has examined the transmitted light from the leaves of various plants, and finds that there is a slight difference in the rays which different leaves absorb and utilize; and this, he believes, explains the fact that certain plants flourish in the shade of trees, while others will scarcely exist; in the former case it is supposed that the rays required by the plant are not absorbed by the leaves of the trees, but in the latter they are.

Physiology of Grafting.—Mr. Gœppert, in Silesia, gives results of some observations in reference to tree-grafting, substantially as follows: Upon the vertical surface of the stock a tissue of parenchyma is developed, proceeding from the medullary rays, which enters into intimate connection with that of the scion. At the same time the cambium of the scion unites perfectly with that of the stock. The place of this union remains visible, and is named by Mr. Gœppert the line of demarkation. All development above this line belongs to the scion, all below to the stock. The stock, entirely deprived of leaves, furnishes, as it were, the crude sap to the scion, which by its organs of vegetation assimilates it. But as soon as the descending sap has passed the line

of demarkation it assumes again all the peculiarities due to the nature of the stock, and as no leaves are allowed on the stock to elaborate the sap it appears that the thin stratum of tissue formed at the connection is the only means of producing this change and thus retaining the characteristic distinctions of scion and stock. Such mutual independence is also often seen in the difference in growth, the stock frequently surpassing the scion, and inversely.

THE NUMBER OF EGGS FROM A HEN.—A German naturalist answers the question how many eggs a hen can possibly lay, as follows: The ovary of a hen contains about six hundred embryo eggs, of which, in the first year, not more than twenty are matured. The second year produces one hundred and twenty; the third, one hundred and thirty-five; the fourth, one hundred and fourteen; and in the following four years the number decreases by twenty yearly. In the ninth year only ten eggs can be expected, and thus it appears that after the first four years hens cease to be profitable as layers.

AMOUNT AND ORIGIN OF MINERAL MATTER IN PLANTS.—Baudrimont, in the course of an examination into the amount of mineral matter in plants, determined the composition of quite a number of species, and arrived at the following conclusions: First, that mineral matter is found in all plants, even in those of aerial growth, which would scarcely seem likely to have the power of acquiring it; second, that the mineral matter contained in plants occurs in at least two distinct conditions, namely, as a simple solution in the vegetable juices, either not having been yet utilized or unassimilable as the product of dejection, or else as finally united to or fixed with organic matter; third, this latter mode of union may occur in variable proportions, from the smallest quantity indispensable to the production of organic matter to a maximum, where the reciprocal action becomes zero.

The variability of the relative proportion of the organic mineral matter shows that these are not united to each other, as the fundamental chemical elements are united. In place of an intimate combination in definite proportions between the elements of molecules, there is only a simple adhesive union, with the preservation of the fundamental structure of organic products.

Baudrimont was much struck by finding that *Cactus peruvianus* contained 94 per cent. of water and volatile matter, and .04 per cent. of organic matter; and, therefore, that .05 per cent. of organic mineral matter was sufficient to give this plant a definite form, and a texture which enables it to resist atmospheric agencies.

PROPERTIES OF EUCALYPTUS.—An elaborate essay upon the *Eucalyptus* appears in the October number for 1871 of the Bulletin of the Acclimation Society of Paris, as prepared by M. Raveret-Wattel. In this the merits of the tree for many purposes are detailed at length.

UTILIZATION OF SUINT.—In nothing is the spirit of the age more clearly shown than in the efforts made to utilize waste substances. This is being done with such effect that what was formerly got rid of with great difficulty and at considerable expense may become one of the most important objects of manufacture. We need only point to such matters as sewage, the slag of furnaces, the fine coal of commerce, the waste of pyrites used in the manufacture of sulphuric acid, &c., as illustrations. Quite a recent instance of this improved economy is found in the treatment of the wool of sheep. It has been ascertained that sheep derive from the soil upon which they pasture a considerable

amount of potash, which, after it has circulated in the blood, is excreted from the skin with the sweat, and remains, generally in connection with this, attached to the wool. Chevreuil discovered, some time ago, that this peculiar mixture, known by the French as suint, constitutes not less than one-third the weight of the raw merino fleece, from which it is easily removed by immersion in cold water. In ordinary wools the suint is less, the amount being about 15 per cent. of the raw fleece. Formerly it was considered as a kind of soap, mainly for the reason that the wool, besides this, sometimes contained about 8 per cent., or a not inconsiderable quantity of fat. This fat, however, is usually combined with earthy matters, mostly with lime, and consequently forms a soap which is very insoluble. The soluble suint is a neutral salt arising from the combination of potash with a peculiar animal acid, of which little more is known than that it contains saltpeter. Special effort has lately been directed to suint, in order to obtain as much as possible of the potash eliminated from the animal, and a special industry has been established at various portions of the great French wool district, such as Rheims, El Bœuf, &c.

A company purchases from the wool-raisers the solution of the suint obtained by rinsing the wool in cold water; the price paid for it being higher in proportion as it is more concentrated. As a general thing it is maintained that a fleece weighing nine pounds contains about twenty ounces of suint; which should contain about one-third part, or six to seven ounces of potash, although not more than five and one-half ounces are perhaps directly available.

In the wool manufactories of the towns just referred to there are nearly 60,000,000 pounds of wool washed annually, the yield of about 6,750,000 sheep. This quantity should contain over 3,000,000 pounds of pure potash. Thus, the water in which the wool is washed, and which has been heretofore thrown away, is made to yield a product, adding appreciably to the value of the wool itself, and more than covering the cost of its treatment. It is, of course, not an easy matter to utilize this solution of suint on a small scale; but wherever the work is carried on by the wholesale, as it is in connection with all great manufacturing establishments, it will undoubtedly become a regular part of the process of manufacture.

PREVENTING HEATING IN GRAIN-STACKS.—A simple instrument has lately been devised, under the name of the Hay-stack Ventilator, for the purpose of ascertaining and counteracting the heating in the interior of stacks of hay or grain. This consists of a wrought-iron tube, about 3 inches in diameter, which is long enough to reach into the middle of the stack, and, like the Norton well-tube, is provided with a conical point at the tip, and pierced for about two-thirds its length with numerous holes. A screw arrangement is affixed to the posterior extremity, by which it can be connected with an accompanying discharge-pipe.

For use this apparatus is to be driven horizontally into the stack to be investigated, either by means of a mallet or by a screw arrangement, and the temperature ascertained after a short interval by introducing a self-registering thermometer. Should the temperature be too high at any point in the stack, a tin tube is to be affixed vertically to the outer end of the iron tube, and an outward current of air from the interior of the stack produced, by means of which the heat is speedily carried off without any injury to the stack. Hooks may be attached to the tip of the instrument, by which small samples of the central part of the stack can be brought out.

FERMENT FUNGI.—Dr. Engel, of Strasburgh, has ascertained that alcoholic fermentations is accompanied by the development of two different genera of fungous plants, while that of fruits embraces four kinds. These latter ferments are found almost always on the surface of the fruit, where they remain in a latent condition without development. When, however, the epidermis becomes cracked, or when the stem of the fruit is separated, the ferment (or its spores) comes into contact with the sacharine juices, and the ferment is then reproduced, but always in the form of ferment and never in that of mold. Engel maintains that the alcholic ferment exists in nature, although the fact has been denied by others. Thus, as long as a cherry is intact it has a particular savor; when, however, the stem is detached or the epidermis is cracked, the cherry not only changes its color, but assumes a vinous taste, and exhibits a large number of fermented cellules.

He also remarks that the ferment of bread is of a different species from the yeast of beer, and that he has never been able to germinate the spores of ferments in vegetables which contained but little sugar, or none at all; but that as soon as they come in contact with sacharine liquid they germinate or reproduce the ferment.

DESTROYING CATERPILLARS.—According to Schmidt, an excellent remedy against caterpillars consists in a dilute solution (1 part in 500) of sulphide of potassium, the infested tree being sprinkled with this substance by means of a small hand-syringe. This method has been used on a large scale in Southern France, and, it is said, without any injury to vegetation.

CHROMIC ACID AS AN ANTISEPTIC.—Dr. Dougall states that chromic acid, as an antiseptic, is far beyond carbolic acid, and, in fact, may be considered as standing at the very head of the list. In one instance an ounce of ox muscle was immersed for twenty-four hours in a solution of one part of chromic acid in 2,000 of water, and then suspended in the air. At the end of six days it became as hard as wood, in which condition it remained three months without mold or taint. The same quantity of ox muscle was soaked twenty-four hours in a solution of one part carbolic acid in 1,000 of water, and then suspended in the air, and at the end of six days it was much hardened, colored brownish black, speckled with mold, and distinctly tainted. Its action as an antiseptic consists in coagulating the protein compounds, a property which it possesses in the highest degree; and its power of coagulating the albuminous cells is ten times that of carbolic acid, twenty times that of bichloride of mercury, and one hundred and fifty times that of chloralum. It also coagulates, hardens, and oxidizes decomposing organic matter, and when added to putrid flesh, urine, or fœcal matter, the offensive odor is soon absolutely removed, the mixture remaining fresh for an indefinite time.

ORIGIN OF MALARIA.—Mr. Daniel Vaughan, of Cincinnati, contends that malaria results primarily from the volatile oils of plants, which become evaporated from their surfaces and are carried into the atmosphere. If these were uniformly diffused, he thinks they would produce little injury, but being carried from the high grounds into the moist, damp, low lands, they become accumulated in an excessive degree, and produce the evils referred to. He does not suppose that all the volatile oils have the same effect on human life, some, probably, being much more potent than others; but he thinks that this question can only be settled by observation and experiment.

POLLUTION IN WATER.—A bill in reference to public health has been brought before the British Parliament, with a strong probability of its becoming a law, embracing, as it does, the recommendation of the Royal Sanitary Commission, which has been engaged for some time past in suggesting points for legislation. The principal part of the enactments have reference to the pollution of water by the discharge of refuse animal, solid or liquid, matters into it; and as it may be of interest to our readers to know what the highest sanitary authorities in England consider as "pollutions" of water, we append their definitions of the same as given by the act.

1. Any liquid containing in suspension more than three parts, by weight, of dry mineral matter, or one part by weight of dry organic matter in 100,000 parts, by weight, of the liquid; or,
2. Any liquid containing in solution more than two parts, by weight, of organic carbon, or .03 by weight of organic nitrogen, in 100,000 parts, by weight, of the liquid; or,
3. Any liquid which exhibits by daylight a distinct color, when a stratum of it one inch deep is placed in a white porcelain or earthenware vessel; or,
4. Any liquid which contains in solution, in 100,000 parts by weight, more than two parts by weight of any metal, except calcium, magnesium, potassium, and sodium; or,
5. Any liquid which, in 100,000 parts by weight, contains, whether in solution or suspension, in chemical combination or otherwise, more than .05 part by weight of metallic arsenic; or,
6. Any liquid which, after acidification, with sulphuric acid, contains, in 100,000 parts by weight, more than one part by weight of free chlorine; or,
7. Any liquid which contains, in 100,000 parts by weight, more than one part by weight of sulphur, in the condition either of sulphuretted hydrogen, or of a soluble sulphuret; or,
8. Any liquid possessing an acidity greater than that which is produced by adding two parts by weight of real muriatic acid to 1,000 parts by weight of distilled water; or,
9. Any liquid possessing an alkalinity greater than that produced by adding one part, by weight, of dry caustic soda to 1,000 parts, by weight, of distilled water.

FUNCTION OF POTASSIUM IN SOILS.—According to Nobbé, the presence of potassium in soils is necessary in order to enable the chlorophyll grains of the leaves to form starch; sodium and lithium being unable to replace potassium in this function, the latter indeed being actually injurious. He has also ascertained that the different combinations of potassium vary very much in their value, the chloride being by far the most efficacious.

PREVENTING SOWS FROM DEVOURING THEIR YOUNG.—It is well known that sows not unfrequently attack and devour their own young; or if prevented from this, will not let down their milk, so that the young pigs necessarily die for want of nourishment. When this state of things is not caused by a diseased condition of the uterus, it is said that the sow can be brought to terms by pouring a mixture of ten to twenty grains of spirits of camphor, with one to three of tincture of opium, into the ear. The sow will immediately lie down on the side of the ear to which the application was made, and remain quiet for several hours in this position without interfering with her pigs; and on recovery from the stupor will have lost her irritability in regard to them. The experiment has been tried in Germany hundreds of times, according to one of the agricultural journals, without any injurious effects. It is also said that the eating of pigs by the parent sow can be readily prevented by rubbing them all over with brandy, and making the same application about the nose of the sow herself.

FACTS FROM VARIOUS SOURCES.

HOPS.—E. F. Lewis, secretary of the agricultural society at Lenox, New York, writes: "Hops are in demand at a high figure, the extreme prices of last year encouraging farmers to increased acreage."

The San Joaquin Farmers' Club, at Stockton, California, has advertised for two thousand hands for the wheat harvest, to supply a deficiency of laborers occasioned by the great increase of acreage planted this season in the San Joaquin Valley. A scarcity of permanent farm-labor in that region is reported.

WHEAT AND CHINCH-BUGS.—Isaac Colburn, secretary of the Farmers' Club at Loami, Sangamon County, Illinois, reports the prevalence of chinch-bugs before the first of May, and gives a glowing account of wheat prospects.

ANGORA GOATS IN UTAH.—A co-operative company formed through the efforts of J. E. Johnson, editor of the Utah Pomologist, arranged for the importation of 130 Angora and Thibet goats, and succeeded in obtaining 108, a portion being lost in a severe storm on the Union Pacific Railroad. These are in good condition, and are intended for crossing with the common goat.

IMPORTATION OF SUGAR-CANE.—Mr. Peter M. Lapice, of New Orleans, is on his way to India, by way of the isthmus of Suez, with the intention of procuring from the islands of Sumatra, Java, and Prince of Wales, specimens of the best Java ribbon-cane, and other popular varieties, for cultivation by himself and other planters in Louisiana, several of whom have joined in a contribution of $5,000 toward defraying the expenses of the importation.

INJURY BY FROST.—The Grape-growers' Association of Napa, Solano and Sonoma Counties, California, at a recent meeting, discussed the injury done to vineyards by late severe frosts, and the proper treatment of the injured vine. They concluded that the first accounts of the injury done were highly exaggerated. The loss to the Buena Vista vineyard in Sonora is placed at $25,000, and other vineyards have suffered losses of $10,000 to $15,000 each; but through the entire valley it is thought that the damage will not exceed one-fifth of the crop. With regard to treatment, the plan of pulling off the whole frosted shoot was rejected, on the ground that the dormant buds, near those shoots, on last year's wood, would thereby be injured or lost. Leading grape-men proposed to cut off only the injured part, retaining one or two sound buds, if the frost had left such, nearest the old wood.

CALIFORNIA RAISINS.—Several grape-growers in California have succeeded in producing raisins of fine quality. Messrs. Wadsworth & Butterfield, from their vineyard on the foot-hills near Nevada City, have produced, from 450 pounds of grapes, 150 pounds of raisins of superior flavor, claimed to be equal to the best Malaga, and worth 24 cents per pound. This furnishes a fine margin for profit, as it secures 8 cents per pound for grapes, which is a very remunerative figure in California.

SUGAR IN SAINT MARY'S PARISH, LOUISIANA.—It is reported that Mr. Etienne Maynard, who, after the war, began without a dollar, and with one row of seed-cane in a garden, made, the second year, 41 hogsheads of sugar; and now, as the fruit of that small beginning, owns a plantation fully stocked, and worth at least $25,000. The secrets of Mr. Maynard's success are industry, economy, and good implements.

SOUTHERN CALIFORNIA.—Mr. O. Traver reports a new settlement in Santa Anna Valley, San Bernardino County, Southern California, at a location fifty miles east of the Pacific, and 1,000 feet above its level. It is less than eighteen months old, and contains about sixty families, of industrious, enterprising habits, chiefly from States in the valley of the Mississippi. They are on lands lying along and from 60 to 100 feet above the level of the Santa Anna River; from which, for purposes of irrigation, they have constructed an aqueduct nine miles in length. Last autumn, corn ripened planted as late as the 1st, and beans as late as the 23d of August. A large area of wheat and barley, sown after the 20th of December, promises a good yield; and these grains will be harvested in season for a crop of corn or vegetables on the same ground. Strawberries, unprotected, were ripe the latter part of March. The location is described as very healthy, and the climate and soil as favorable for the raisin-grape and tropical fruits. For the first half of March the average temperature was, at 7 a. m., 47°; at 2 p. m., 73°; at 6 p. m., 60°: maximum, 82°; minimum, 32°; and when at the latter point, it is remarked as a peculiarity of the climate, that corn and beans were slightly, if at all, injured.

EFFECT OF SNOW ON THE TEMPERATURE OF THE SOIL BENEATH IT.—Mr. C. G. Prindle, of Chittenden County, Vermont, has made an experiment designed to ascertain how far soil is protected from cold by snow. For four successive winter days, there being four inches of snow on a level, he found the average temperature immediately above the snow 13° below zero; immediately beneath, 19° above zero; under a drift two feet deep, 27° above zero.

A LARGE WHEAT-FIELD.—It is claimed that a farmer named Mitchell in the San Joaquin Valley, California, is the largest wheat-grower in the United States. Early in March he had planted 36,000 acres, and expected to make the amount over 40,000 by the middle of that month. At 15 bushels per acre, which may not be too high an estimate for this year, this would give a crop of 600,000 bushels, and that, at 60 cents per bushel—not a high estimate—would bring $360,000. The average expense of planting and harvesting wheat in that region is estimated at $4 per acre, which would leave a clear profit of $200,000.

ORANGES IN CALIFORNIA.—It is reported that the crop of oranges in San Bernardino County is estimated by good judges as five times larger than last year's crop, and that about 5,000,000 oranges had been shipped as early as the 1st of May, at prices averaging about $25 per thousand.

THE OHIO STATE FAIR FOR 1872 will be held at Mansfield, Richland County, September 2 to 6. Persons wishing to exhibit are referred to Mr. John H. Klippart, corresponding secretary State board of agriculture, Columbus, Ohio.

SUGAR-CULTURE IN LOUISIANA.—It is reported that on the Porche plantation, in the parish of Terrebonne, Mr. Champagne made in 1871 172 hogsheads of sugar, weighing 226,113 pounds, and 192 barrels of molasses. The sugar sold for $17,708, equal to $7\frac{2}{10}$ cents per pound; the molasses for $2,853: total, $20,561. The cost of production is estimated at $11,454, leaving as net profits $9,107. If we deduct the value of the molasses from the whole cost, it leaves, as the cost of the sugar, $8,601, equal to $3\frac{8}{10}$ cents per pound, leaving a profit of $4\frac{1}{10}$ cents per pound.

CORN FODDER.—Mr. Alexander Reed, of Lockhaven, Clinton County Pennsylvania, reports that his practice is to cut up his corn as late as he can, and avoid frost. After husking, the stacks are bound and carefully shocked till cured, then stowed in barn. They are prepared for feed as follows: Each morning and evening the quantity needed for one feeding is cut with a "power-cutter," put in a tight box with a mixture of meal and bran sprinkled in; boiling water is then poured on, and the box closed with a tight lid, so as to shut in both heat and steam. That steamed at night is warm when fed in the morning, and that in the morning when fed in the afternoon. Mr. Reed states that, prepared in this way, the cows eat all the butts, and a ton will produce more and much better milk for butter than a ton of the best hay prepared in the same way.

BREEDS OF FARM ANIMALS FOR HILLY REGIONS.—Mr. W. S. Rand, of Lewis County, Kentucky, gives the results of his experience in raising cattle and sheep in different localities. In 1860 he removed from Mason County, which is comparatively level and of a limestone soil, to Lewis County, which is mountainous and its soil a sandy loam. In the latter he found the poorer grazing compensated for, in part, by the beneficial effects of pure, soft, running water, as contrasted with the deleterious effects of the hard and still water of the former. Finding in the county no other than small native stock, he procured a large short-horn bull, of pure blood. The result was that nearly all the native cows put to him needed assistance in calving, and in many cases both cow and calf perished. Moreover, the bull proved to be too heavy and clumsy for grazing on a mountainous region, and finally died in consequence of falls and sprains. A large, short-horn cow met with a similar fate. Mr. Rand observed that the light Alderneys, and especially the light and nimble Devons, requiring less food and less traveling, as well as having less weight to carry about, would satisfy their wants by feeding a few hours, and then lie down and ruminate as long. Alternating in this way through the day, at its close they would be plump and unwearied, whereas the heavier cattle, having to toil and climb all day in ineffectual endeavors to satisfy their larger wants, would look gaunt and wearied out. His conclusion is, that the smaller and nimbler species, particularly the red Devons, are the most profitable for mountainous grazing, while the short-horns and kindred species are more desirable for fertile plains. He had a somewhat similar experience with sheep. With a view to improve the mutton and wool-bearing and fattening qualities of the very small but hardy, fleet native sheep in the county, he crossed them with South Downs with very satisfactory results. But an attempt to cross this improved grade with Cotswolds resulted in the same difficulty that occurred in crossing large with small cattle. The lamb, at the time of birth, was so large that in many cases both it and its dam perished. He claims, however, to have succeeded in breeding a flock of mixed blood, in which the best qualities of the South Downs, the Cotswolds, and the natives are united.

TEA-GROWING IN INDIA.—The experiment of growing tea in India is proving quite successful. In 1862 the crop was estimated at 1,000,000 pounds; in 1871 at something over 20,000,000. It is claimed that India can now compete with China in producing teas of the best quality.

AMERICAN PLANTS IN ENGLAND.—The director of the royal gardens at Kew, England, reports as received from this country in 1871, 353 packages of seeds, 103 green-house and 52 herbaceous plants, and 19 trees and shrubs.

CINCHONA.—It is claimed that a new variety of cinchona tree, of superior value, has been originated in India. Recently plants, eight feet high, of the new, and of the common species, raised on the Neilgherry plantations, were analyzed, with the following results: The new yielded of quinine, 7 parts; of alkaloid, 11.50; the common, of quinine, 2.42; of alkaloid, 4.52.

PERCENTAGE OF CREAM AS AFFECTED BY TEMPERATURE.—Mr. C. Schermerhorn, supervisor of a cheese-factory at Derbyshire, England, took a certain quantity of average milk—dipping it from vats in which milk was mixed—and set it in a cream-gauge daily from April 1 to October 31. For April the average percentage of cream was 10.66; May, 9.931; June, 8.75; July, 8.253; August, 9.12; September, 10.875; October, 12.49. It will be observed that the average of cream diminished as the average temperature rose, and *vice versa*. Mr. Schermerhorn also found like results attending the daily rise and fall of the thermometer, the hottest days yielding the smallest percentage of cream.

NEW ZEALAND FLAX.—Mr. A. Carr, of Carbondale, Pennsylvania, who for some years resided in New Zealand and gave special attention to the variety of flax cultivated in that island, thinks it could be profitably produced in this country. The dressed fiber commands the present year in the English market £25 per ton, and in New York 9 cents per pound in gold. It can be used as a substitute in all products manufactured from the common variety, as linen, cordage, paper, &c., and is extensively used for stuffing chairs, mattresses, &c., being as suitable and durable for that purpose as horse-hair.

DIVERSITY IN SOUTHERN INDUSTRY.—The corresponding secretary of the Pioneer Agricultural Society of Halifax, North Carolina, observes that the practice of raising large cotton crops to the neglect of other farm products sufficiently accounts for the extensive wastes which so frequently meet the eye, covered with second growth pines and cut up by gullies. He states that the people are waking up to this fact, and, so far as their shattered resources admit, are beginning to practice mixed husbandry and rotation in crops. With reference to the same subject, Mr. E. A. Crandall, of Oxford, Alabama, writes:

> We are wounded and bruised, and must have mollifying ointment to effect a cure; this of the tiller as well as of the soil. Not at once can it be expected of us, but gradually it is to be hoped we may be induced to work ourselves into that more enlightened and rational path, embracing all the various branches of industry and leading to better methods, wherein lies more certain success, not for the South only, but equally for our whole, unsectional, undivided country.

Mr. Richard H. Day, of Baton Rouge, Louisiana, writes:

> The South wants labor, capital, and diversified industry. The latter will eventually bring the two former. Heretofore the cultivation of cane and cotton have monopolized the entire attention of our people. The folly of the system is beginning to be understood, and other crops are being cultivated. It is now demonstrated that in this latitude apples, pears, peaches, and, indeed, almost any fruit, can be successfully raised. With proper attention good crops of corn may be raised. I have been raising corn on a few acres consecutively since 1867, and every year increasing the yield without commercial fertilizers. This year the yield was over one hundred bushels to the acre.

Mr. H. Tatwiler, of Havana, Alabama, thinks that the salvation of the South depends largely on the introduction of cereals and grasses. "It will take time for our planters to get over their antipathy to grass—a thing they have been fighting all their lives; but nothing else will meet our deficient supply of labor."

COST OF LABOR IN THE SOUTH.—Mr. H. Hammond, of Augusta, Georgia, writes:

We feel more and more the need of information as the problems set before us by the emancipation of our laborers continue to widen. * * We cannot understand how it is that, with a soil and climate producing crops that give a much larger money-yield per acre than in the Northern and Western States, we are not able to pay one-fourth the wages to labor that are paid there; unless it be that a laborer does more there than he does here. We, therefore, feel a great interest in knowing the cost of the various sorts of farm work, by the piece, in the different sections; *e. g.*, daily wages being $1, what does it cost to break up, broadcast, an acre of ground; to plant an acre of wheat; to build 100 feet of fence; to lay off an acre of corn; to cut an acre of grass, &c., &c.

IMPROVED QUALITY OF COTTON.—The correspondent above quoted says:

We believe that our cotton-seeds might be greatly improved by a system of budding and hybridizing the varieties of this plant where it could be scientifically conducted for a length of time, as it might be under glass; and we believe that the southern cotton-planter must rely more and more on the excellence of the staple he produces to overcome competition from other countries.

MARKET PRICES OF FARM PRODUCTS.

Articles.	May.	June.
NEW YORK.		
Flour, superfine, State ..... per barrel..	$6 50 to $6 90	$6 00 to $6 50
extra, State ..... do.....	7 10 to 8 00	7 00 to 7 90
superfine western ..... do.....	6 50 to 6 90	6 00 to 6 50
extra to choice western ..... do.....	7 00 to 12 00	6 95 to 12 00
extra southern ..... do.....	8 00 to 9 75	8 25 to 10 75
good to choice southern ..... do.....	9 00 to 12 25	10 80 to 13 00
Wheat, No. 1 spring ..... per bushel..	1 65 to 1 66	1 74 to 1 76
No. 2 spring ..... do.....	1 59 to 1 64½	1 68 to 1 71
winter, red, western ..... do.....	1 80 to 1 84	1 90 to 2 00
amber, western ..... do.....	1 87 to 1 92½	2 05 to 2 08
white, western ..... do.....	1 88 to 2 05	2 00 to 2 12
Rye ..... do.....	92 to ———	95 to 96
Barley ..... do.....	67½ to ———	1 05 to 1 06
Oats ..... do.....	52½ to 56	54 to 56
Corn ..... do.....	71½ to 74	68 to 72½
Hay, shipping qualities ..... per ton...	29 00 to 30 00	32 00 to 38 00
prime ..... do.....	31 00 to 36 00	34 00 to 38 00
Pork, mess ..... per barrel..	13 60 to 13 75	13 00 to 13 25
prime ..... do.....	11 25 to ———	10 50 to 10 75
Beef, plain mess ..... do.....	8 00 to 9 50	8 00 to 9 50
extra mess ..... do.....	10 00 to 12 00	10 00 to 12 00
Lard ..... per pound..	8¾ to 9⅝	8¾ to 9⅝
Butter, western ..... do.....	20 to 25	15 to 25
State dairy ..... do.....	30 to 31	27 to 30
Cheese, western dairy ..... do.....	14 to 17	10 to 13
State factory ..... do.....	15 to 17½	13 to 14¾
Cotton, ordinary to good ordinary .... do.....	20 to 22¾	20¾ to 23⅞
low middling to good middl'g .do.....	23 to 25	25½ to 27⅝
Tobacco, lugs, all grades ..... do.....	8 to 9¼	8¼ to 9½
common to medium leaf .... do.....	9 to 10¾	9 to 10¾
Wool, pulled ..... do.....	78 to ———	70 to 82
tub-washed ..... do.....	90 to ———	.....
California, spring clip ..... do.....	.....	.....
fall clip ..... do.....	37½ to ———	30 to ———
Texas, inferior to common ..... do.....	.....	.....
BOSTON.		
Flour, western, superfine ..... per barrel..	6 50 to ———	6 50 to ———
extras ..... do.....	7 25 to 8 50	7 25 to 8 50

Market prices of farm products—Continued.

Articles.	May.	June.
BOSTON—Continued.		
Flour, western, choice ..... per barrel..	$9 50 to $12 50	$9 50 to $13 00
southern extras ..... do.....	7 25 to 7 50	7 25 to 7 50
choice Baltimore ..... do.....	10 00 to 12 50	10 00 to 13 00
Wheat ..... per bushel..	1 75 to 2 10	1 75 to 2 10
Rye ..... do.....	92 to 95	92 to 95
Barley ..... do.....	75 to 1 20	75 to 1 20
Corn, southern yellow ..... do.....	77 to 77⅓	76 to 77
western mixed ..... do.....	75 to 76	74 to 76
western yellow ..... do.....	76½ to 77⅓	76 to 77½
Beef, mess ..... per barrel..	10 00 to 12 00	10 00 to 12 00
extra ..... do.....	12 00 to 16 00	12 00 to 16 00
Pork, prime ..... do.....	11 50 to 12 50	11 50 to 12 50
mess ..... do.....	14 25 to 14 50	14 25 to 14 75
Lard ..... per pound..	9¼ to 9½	9⅛ to 10
Butter, New York and Vermont ..... do.....	15 to 31	18 to 30
Canada, good to choice ..... do.....	25 to 30	25 to 29
western ..... do.....	12 to 28	12 to 27
Cheese, N. Y. and Vt., choice factory .. do.....	17 to 17⅓	13 to 14
Ohio choice factory ..... do.....	16½ to 17	13 to 14
Hay ..... per ton...	32 00 to 38 00	35 00 to 41 00
Wool, Ohio and Pennsylvania ..... per pound..	75 to 85	68 to 78
Michigan ..... do.....	75 to 80	65 to 73
other western ..... do.....	73 to 78	65 to 72½
California ..... do.....	35 to 55	30 to 60
Texas ..... do.....	35 to 50	35 to 50
combing-fleece ..... do.....	90 to 95	88 to 90
PHILADELPHIA.		
Flour, superfine ..... per barrel..	5 50 to 6 50	6 00 to 6 75
extras ..... do.....	6 75 to 7 50	7 25 to 7 75
family and fancy brands ..... do.....	8 00 to 11 00	9 50 to 11 50
Wheat, red, Penn. and western ..... per bushel..	2 05 to 2 08	2 10 to 2 15
amber ..... do.....	----------	2 20 to 2 25
Rye ..... do.....	1 00 to ———	1 10 to ———
Corn, yellow ..... do.....	72 to ———	69 to 70
mixed, western ..... do.....	72 to ———	69 to 70
Oats, western white ..... do.....	54 to 55	59 to 69
Pork, mess ..... per barrel..	13 75 to 14 00	14 00 to 14 25
Beef, mess, city packed ..... do.....	14 50 to 15 00	14 00 to 14 75
Lard ..... per pound..	09 to 09½	09 to 09½
Cotton, middling ..... do.....	23¾ to 24¼	25½ to 26½
BALTIMORE.		
Flour, superfine ..... per barrel..	7 00 to 8 75	7 50 to 9 25
extra ..... do.....	8 00 to 9 00	8 50 to 9 50
family and fancy ..... do.....	12 50 to ———	13 50 to ———
Wheat, Pennsylvania ..... per bushel..	1 98 to 2 00	2 10 to ———
western ..... do.....	2 00 to 2 05	2 10 to ———
Maryland ..... do.....	----------	2 05 to 2 25
Rye ..... do.....	1 00 to 1 05	95 to 1 05
Corn, yellow ..... do.....	69 to 70	73 to 75
white ..... do.....	72 to 73	77 to 78
Hay, western ..... per ton...	35 00 to ———	34 00 to 35 00
Pennsylvania and Maryland .... do.....	35 00 to ———	35 00 to 40 00
Pork, mess ..... per barrel..	14 00 to 14 25	13 75 to 14 00
Butter, western, prime to choice .. per pound..	23 to 30	22 to 27
New York ..... do.....	30 to 35	----------
Cheese, western factory ..... do.....	15 to 16	13 to 14½
eastern factory ..... do.....	18 to 18½	----------

Market prices of farm products—Continued.

Articles.		May.	June.
BALTIMORE—Continued.			
Lard	per pound	$0 08⅝ to $0 09½	$0 08⅝ to $0 09½
Cotton, ordinary	do	20½ to ———	19½ to ———
middling	do	23⅛ to ———	24⅛ to ———
Tobacco, common to good lugs	per cwt	7 00 to 8 50	6 50 to 8 00
common to medium leaf	do	7 50 to 9 00	7 00 to 9 50
Wool, unwashed, free from burrs	per pound	47 to 50	45 to 46
tub-washed	do	80 to 83	70 to 75
CINCINNATI.			
Flour, superfine	per barrel	6 75 to 7 25	6 65 to 7 25
extra	do	7 15 to 8 35	8 35 to 8 50
family	do	8 35 to 8 50	8 50 to 8 75
Wheat, No. 1 white	per bushel	2 00 to 2 05	2 00 to 2 05
No. 2 white	do	———	———
No. 1 red	do	1 88 to ———	1 90 to ———
No. 2 red	do	1 85 to ———	1 85 to 1 87
Corn, white	do	50 to 51	53 to 54
yellow	do	———	———
Oats, white	do	45 to ———	45 to 46
No. 1, mixed	do	43 to ———	42 to ———
Rye	do	92 to 94	90 to 96
Barley, winter, No. 2	do	65 to 75	70 to 75
spring, No. 2	do	65 to 75	60 to 65
Hay, com. to choice	per ton	18 00 to 25 00	20 00 to 25 00
from store	do	22 00 to 30 00	21 00 to 27 00
Pork, mess	per barrel	13 00 to 14 00	12 00 to 15 00
prime	do	———	———
Beef, plate	do	12 75 to 13 60	12 25 to ———
hams	do	26 00 to 28 00	13 00 to 13 50
Lard, prime, steam	per pound	8⅓ to 11½	8¼ to 11⅝
Butter, Western Reserve	do	28 to 30	20 to 22
choice Central Ohio	do	22 to 28	17 to 20
Tobacco, lugs	do	8 to 18	8 to 18
leaf	do	9 to 25	9 to 25
Wool, tub-washed	do	70 to ———	65 to 68
fleece-washed, manufacturing	do	60 to ———	60 to 65
fleece-washed, combing	do	60 to 70	65 to 70
unwashed, manufacturing	do	45 to 48	40 to 45
unwashed, combing	do	50 to 55	50 to 55
pulled	do	65 to 68	60 to 65
CHICAGO.			
Flour, winter, extra	per barrel	10 00 to 10 50	10 50 to ———
spring, extra	do	7 00 to 8 75	7 00 to 8 25
Wheat, No. 1 spring	per bushel	———	1 51 to———
No. 2 spring	do	1 51 to 1 52½	1 43 to 1 46
No. 3 spring	do	———	1 38 to 1 39
Corn, No. 2	do	47⅝ to 48⅜	42½ to 43¾
rejected	do	45 to 45½	40 to 41
Oats, No. 2	do	41½ to 43	42 to 43½
rejected	do	———	34 to ———
Rye, No. 2	do	85 to ———	75 to 76
Barley, No. 2	do	60 to 64	56 to 60
Hay, timothy, (on track)	per ton	16 00 to 19 00	19 50 to 22 00
prairie	do	10 00 to 12 00	11 00 to 13 00
Pork, mess	per barrel	12 60 to 12 70	11 95 to 12 00
extra	do	———	———
Beef, mess	do	9 00 to 10 00	9 00 to 10 00
Lard	per pound	8¼ to 8⅞	8¼ to 8¼

Market prices of farm products—Continued.

Articles.	May.	June.
CHICAGO—Continued.		
Butter, choice dairy ..... per pound..	$0 25 to $0 27	$0 18 to $0 20
fair to choice tub and firkin .. do.....	16 to 21	14 to 18
Cheese, New York factory ..... do.....	15 to 16	14 to 15
western factory ..... do.....	12 to 14	12 to 14
Ohio factory ..... do.....	13 to 14	12 to 14
Wool, medium fleece ..... do.....	63 to 68	63 to 68
unwashed, medium ..... do.....	40 to 50	46 to 50
tub-washed ..... do.....	62 to 80	62 to 80
SAINT LOUIS.		
Flour, superfine ..... per barrel..	5 50 to 5 75	5 00 to 6 50
extra ..... do.....	6 00 to 8 75	7 00 to 8 50
choice ..... do.....	9 25 to 10 25	9 50 to 10 15
Wheat, red ..... per bushel..	1 85 to 2 14	1 70 to 2 05
white ..... do.....	2 00 to 2 50	1 77½ to 2 15
spring ..... do.....	5 50 to ———	1 40 to 1 45
Corn, mixed ..... do.....	45 to 56½	44 to 59
yellow ..... do.....	45 to 56	47 to 55
white ..... do.....	49 to 60	56 to 62
Oats, white ..... do.....	48 to 51	——— to ———
mixed ..... do.....	48 to 51	39 to 41
Rye ..... do.....	80 to 83	70 to 71
Barley, winter ..... do.....	80 to 82½	70 to ———
spring ..... do.....	41 to 75	——— to ———
Hay ..... per ton..	21 00 to 25 00	18 00 to 23 50
Pork, mess ..... per barrel..	12 75 to 13 00	12 00 to 12 50
Lard, prime steam ..... per pound..	9 to 10	9¼ to 10¼
kettle ..... do.....		
Butter, choice ..... do.....	25 to 27	18 to 20
medium to fair ..... do.....	18 to 23	16 to 17
Cheese, choice factory ..... do.....	17 to 19	13 to 13½
Cotton, middling ..... do.....	22½ to ———	25 to 25⅝
Tobacco, lug ..... per cwt..	6 80 to 8 00	7 50 to 8 50
common leaf ..... do.....	8 00 to 8 75	8 00 to 8 75
medium to good leaf ..... do.....	9 00 to 11 00	9 00 to 11 00
Wool, tub-washed ..... per pound..	63 to 77½	65 to 71½
fleece-washed ..... do.....	50 to 60	54 to 56
unwashed medium ..... do.....	43 to 45	45 to 48
NEW ORLEANS.		
Flour, superfine ..... per barrel..	6 25 to ———	6 62½ to ———
extras, (according to grade) .... do.....	6 50 to 12 00	7 00 to 12 00
Corn, white ..... per bushel..	72 to 73	72 to 75
yellow ..... do.....	70 to 72	74 to 75
mixed ..... do.....	70 to 71	72 to 73
Oats ..... do.....	64 to 65	53 to 56
Hay, choice ..... per ton..	35 00 to ———	34 00 to 35 00
prime ..... do.....	35 00 to ———	34 00 to 35 00
Pork, mess ..... per barrel..	13 50 to 14 00	13 12½ to 13 50
Beef, mess, (Texas) ..... do.....	11 00 to 12 00	11 00 to 12 00
Lard, tierce ..... per pound..	9⅝ to 10	9 to 9⅝
keg ..... do.....	10½ to 11	10¾ to 11¼
Butter, choice western ..... do.....	28 to 30	25 to 28
Goshen ..... do.....	40 to ———	38 to 40
Cheese, choice factory ..... do.....	——— to ———	12 to 14
western reserve ..... do.....	17 to ———	——— to ———
New York cream ..... do.....	22 to ———	——— to ———
Cotton, ordinary to middling ..... do.....	19½ to 23⅛	19½ to 24

Market prices of farm products—Continued.

Articles.	May.	June.
NEW ORLEANS—Continued.		
Cotton, middling to good middling.per pound..	$0 23 to $0 23¾	$0 24⅛ to $0 24¼
Tobacco, lugs.....do.....	8 to 9	8 to 9
low-leaf.....do.....	9 to 10	9 to 10
medium.....do.....	10 to 10½	10 to 11½
SAN FRANCISCO.		
Flour, superfine.....per barrel..	4 50 to 5 00	4 75 to 5 00
extra superfine.....do.....	5 50 to 5 75	5 00 to 6 00
higher grades.....do.....	6 10 to 6 25	6 25 to 6 50
Wheat, State.....per cental..	1 85 to 2 05	1 85 to 2 15
Oregon.....do.....	1 85 to 2 05	1 85 to 2 15
Corn, white.....do.....	1 75 to 1 85	1 65 to ———
yellow.....do.....	1 50 to 1 55	1 55 to ———
Hay, State.....per ton..	10 00 to 20 00	16 00 to 23 00
Pork, mess.....per barrel..	17 00 to 22 00	17 00 to 22 00
prime.....do.....	16 00 to 17 50	16 00 to ———
Beef, mess.....do.....	12 00 to 22 00	12 00 to 22 00
Lard.....per pound..	11½ to 13¾	10 to 13
Butter, overland.....do.....	15 to 20	15 to 20
California.....do.....	20 to 25	25 to 30
Oregon.....do.....	10 to 15	10 to 15
Cheese.....do.....	13 to 17	14 to 22½
Wool, native.....do.....	35 to 40	35 to 40
California.....do.....	45 to 55	45 to 50
Oregon.....do.....	40 to 50	40 to 50

MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

JULY, 1872.

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1872.

MONTHLY REPORT.

DEPARTMENT OF AGRICULTURE,
Statistical Division, July 20, 1872.

SIR: I present herewith, for publication, a report of the condition of the crops in the first week in July; consular and other communications concerning the rural affairs of foreign lands, and the results of experiments and investigation in the several divisions of the Department during the past month; with market reports, and various facts from original sources.

J. R. DODGE,
Statistician.

Hon. FREDERICK WATTS,
Commissioner.

CONDITION OF CROPS IN JULY.

A misapprehension appears to exist in many minds as to the time of making and sending crop reports. Many appear to understand, for example, that the July report is made up from local reports received during the month of June. On the contrary, the observations taken on the 1st of July by the regular correspondent, aided by a board of assistants, are put in writing and forwarded to this office, from interior counties in Oregon, or in Texas, or Minnesota, as well as from nearer post-offices, and, as fast as received, their information is tabulated and condensed, averages made and corrected, the tables and digest analyzed, and calculations made, and a summary published between the 15th and 20th of each month, although the reports are never all in on the 15th. Still, there are some persons whose activity outruns their reason, who imagine that a census can be taken and tabulated *weekly*, though mail service to complete it requires two weeks, from points at which telegraphic communication is impossible.

CORN.

Area.—The lateness of the spring and unfavorable weather during the planting season in many sections has prevented any marked enlargement of the area in corn. The tendency is toward an increase in the South, and in the States in which wheat has been predominant. From 989 counties, including an area usually producing 600,000,000 to 700,000,000 of bushels annually, come returns indicating an increase of 3 per cent. This is equivalent to more than three-fourths of a million acres; and the total area in this great crop of the country, which nearly equals in extent the aggregate of all other tilled crops together, is prob-

ably about 35,000,000 acres. The States in which an increase of acreage is reported are as follows: New Jersey, 2 per cent.; Pennsylvania, 2; South Carolina, 2; Georgia, 1; Alabama, 3; Mississippi, 1; Louisiana, 8; Texas, 8; Arkansas, 4; West Virginia, 2; Kentucky, 2; Ohio, 2; Michigan, 10; Indiana, 1; Illinois, 2; Iowa, 1; Missouri, 4; Kansas, 28; Nebraska, 20; California, 1. A diminution appears in Maine of 4 per cent.; Vermont, 2; Massachusetts, 4; Rhode Island, 5; Connecticut, 6; New York, 1; North Carolina, 2; Tennessee, 1; Wisconsin, 4; Minnesota, 3. The area in the remaining States is reported the same as last year.

Condition.—The meteorological peculiarities of the season have received much comment in the returns. The rain-fall is sometimes tenfold greater at one station in a State, during a given month, than at another in the same State. A medium amount of rain, falling moderately in small quantities, at frequent intervals, has a more favorable effect upon the growing crops than a much larger quantity at long and irregular seasons in violent storms. In the Ohio Valley, as in Ohio and Indiana, complaints of long and almost unbroken droughts are received from many counties in different parts of those States, affecting wells and streams, and greatly retarding vegetable growth; while in many other counties seasonable and frequent rains are reported, and in some cases abundant supplies of moisture. In some cases wet districts are in close proximity to dry areas; and both wet and dry localities are sometimes found in the same county. In different sections of the country, in which seasons of drought have occurred, sudden and violent storms have deluged low-lying lands, carried away bridges, and damaged crops. These peculiarities are noticeable during each recurring summer, but the variations in amount of rain-fall, and in the frequency and force of storms, seem greater than usual the present summer. These facts of meteorology, little understood by the wisest, demanding investigation and patient study, have a bearing upon vegetable growth which will some day become obvious, to the increase of farm production and the profit of the farmer. The minimum and maximum rain-fall of the great corn-growing States for the month of June, so far as reported by the meteorological observers of the Smithsonian Institution, are as follows:

	Minimum. *Inches.*	Maximum. *Inches.*
Kentucky	3.38	4.82
Ohio	1.96	7.25
Michigan	2.42	4.35
Indiana	1.40	6.67
Illinois	3.10	9.95
Iowa	1.53	7.90
Missouri	1.45	3.35
Kansas	1.75	4.00

But for the unpropitious meteorological conditions referred to above, the season would have been quite favorable, having an unusual measure of sunshine, and a degree of heat well suited to the growth of corn. The returns from 263 counties place condition above 100; 313 counties report 100; and 413 below average, Illinois is represented by 65 counties, of which 22 stand above average and 23 below; of 64 counties in Missouri, condition of corn is above average in 16, and below in 25; of 36 in Kansas, 8 only send figures less than 100. In Iowa, where cool, cloudy weather generally prevailed in spring, followed by changeable weather, and in some sections heavy rains, only 2 reports of condition are above 100; and in Ohio, where the drought has been severe, but

3 reports of 45 give figures higher than 100. The States making returns higher than 100 are: Vermont, 101; North Carolinia, 101; Alabama, 110; Mississippi, 110; Louisiana, 119; Texas, 110; Kentucky, 103; California, 101. The following return condition below average: Maine, 96; New Hampshire, 98; Massachusetts, 98; Rhode Island, 92; Connecticut, 98; New York, 95; New Jersey, 96; Pennsylvania, 98; Delaware, 92; Maryland, 92; Virginia, 94; South Carolina, 96; Georgia, 94; Florida, 78; Arkansas, 95; West Virginia, 95; Ohio, 90; Michigan, 96; Indiana, 95; Illinois, 99; Wisconsin, 86; Minnesota, 86; Iowa, 88; Missouri, 97; Kansas, 98; Nebraska, 97; Oregon, 97. Tennessee is placed at 100. The following classified statement presents the number of counties reported in each State:

States.	Above average.	Average.	Below average.	States.	Above average.	Average.	Below average.
Maine	2	2	6	Texas	28	7	6
New Hampshire	2	2	3	Arkansas	3	6	7
Vermont	3	3	3	Tennessee	21	13	9
Massachusetts	1	5	3	West Virginia	5	6	17
Rhode Island	------	1	2	Kentucky	17	12	15
Connecticut	1	3	3	Ohio	3	13	29
New York	5	7	19	Michigan	7	11	12
New Jersey	2	4	4	Indiana	9	13	28
Pennsylvania	8	21	11	Illinois	22	20	23
Delaware	------	1	2	Wisconsin	2	4	19
Maryland	2	2	5	Minnesota	2	2	19
Virginia	6	12	29	Iowa	2	12	43
North Carolina	19	21	10	Missouri	16	23	25
South Carolina	3	5	8	Kansas	8	20	8
Georgia	14	21	25	Nebraska	2	5	4
Florida	1	2	11	California	3	9	1
Alabama	14	8	5	Oregon	------	6	4
Mississippi	19	6	------				
Louisiana	11	5	3	Total	263	313	413

Total number of counties, 989.

The following extracts from correspondence are appended:

MAINE.—*Franklin:* Injured by excess of rain. *Piscataquis:* Protracted wet season narrowed the area of corn. *York:* Ground rather wet for corn.

NEW HAMPSHIRE.—*Rockingham:* Delayed ten days by the wet and backward season. *Hillsborough:* Coming forward rapidly; prospect good for a fair crop.

VERMONT.—*Franklin:* About average. *Orleans:* Very backward up to June 15; late warm showery weather has greatly improved the crop.

MASSACHUSETTS.—*Hampshire:* Crops suffered from cut-worms.

RHODE ISLAND.—*Washington:* Injuries by white worms, especially on old meadowland, but confined to land broken this season; crop probably 20 per cent. below average.

NEW YORK.—*Yates:* Looks well, and if frost does not come too soon will be a heavy crop. *Jefferson:* Injured by cut-worms. *Sullivan:* Doing well; weather warmer. *Wyoming:* Small, but stands well. *Genesee:* Late, but stands good and growing finely. *Cattaraugus:* Growing fast. *Otsego:* Backward. *Erie:* Late and small, but of good color. *Ontario:* Growing rapidly.

NEW JERSEY.—*Mercer:* Retarded by late spring. *Morris:* Backward but growing fast.

PENNSYLVANIA.—*Westmoreland:* Improved by recent rains. *Cumberland:* Early corn shortened by drought and cut-worms. *Lancaster:* A little backward. *Berks:* Average. *Bradford:* A little late, but looks well. *Fayette:* Short, but growing finely. *McKean:* Injured by wire and cut-worms. *Indiana:* Promises an average crop. *Centre:* Promises an abundant yield. *Northumberland:* Promising. *Lehigh:* Backward. *Armstrong:* Large crop planted in good condition; suffered from cut-worm, yet growing finely. *Lycoming:* First planting damaged by worms, but has been generally

replanted and is now doing well. *Butler:* Injured by cut-worms; many fields replanted, hence backward. *Montgomery:* Encouraging condition.

DELAWARE.—*Sussex:* Looks very promising.

MARYLAND.—*Baltimore:* Average large; stand good. *Frederick:* Another month's drought will kill the crop. *Montgomery:* Great difficulty in getting a stand where the ground was not plowed in the fall; cut-worm mischievous. *Washington:* Very promising; a favorable season will bring a large crop. *Cecil:* Planted late, and retarded in growth on account of drought. *Queen Anne:* Late rains have greatly improved the crop.

VIRGINIA.—*Albemarle:* Very short, but may come out with rain. *Clarke:* Backward but healthy; a large proportion replanted; cut-worm unusually destructive. *Mecklenburgh:* Very thrifty; greatly benefited by recent rains; much of it replanted. *Nelson:* Clean and healthy, but small. *Prince William:* Not flattering. *James City:* Well worked and in fine condition. *Cumberland:* Backward, and will suffer severely without speedy rain. *Henrico:* Small, but holds color, and with rain will yet make a crop. *Frederick:* Improving. *Prince Edward:* Small and backward, but with a good season will make a fair crop. *Surrey:* Small and backward, but late seasonable weather has greatly improved it. *Highland:* Injured by worms; some fields replanted three times; injured also by drought; late growing weather is rapidly improving the crop. *Orange:* Injured by worm and drought. *Powhatan:* Bad stand. *Fluvanna:* Shortened by drought. *King George:* Crop low, but may yet be good. *Culpeper:* Seriously injured by drought; many fields entirely replanted. *Spottsylvania:* Crop large and promising; worm destructive in good lands, causing some fields to be replanted. *New Kent:* Well worked and in good condition but backward; good rains will make a large crop. *Greenville:* Corn area decreasing to make way for cotton. *Stafford:* Improved by late rains. *Craig:* Crop injured by worms. *Augusta:* Drought and insects prevented an early stand; late rains have helped the crop greatly.

NORTH CAROLINA.—*Gaston:* Growth vigorous; above average. *Forsyth:* Crops promising. *Chowan:* Three weeks late, but looks well. *Alexander:* Yellow field-corn looks well so far. *Lenoir:* Injured by the heavy rains in June. *Bladen:* Crop late but good. *Greene:* Bad stand; at least 20 per cent. below the condition of this time last year. *McDowell:* Very much improved; prospects average. *Hertford:* Small, but doing well. *Beaufort:* June decidedly unfavorable to late planted. *Jones:* Dry hot weather injurious. *Person:* Very fine; pushed rapidly by recent rains and hot sun. *Alamance:* Promises well. *Rowan:* Condition excellent. *Rockingham:* Promising; six weeks more of good weather will make as good a crop as ever was made. *Craven:* Small, but promising a large crop. *Franklin:* Looks well. *Currituck:* Backward, but doing well; prospect of a fair yield. *Perquimans:* Looking well; prospect good. *Edgecombe:* Injured by neglect; all the attention paid to cotton.

SOUTH CAROLINA.—*York:* On valley and loam lands average; on clay lands, below. *Clarendon:* Injured by drought; stalks low; crop will probably be short. *Orangeburg:* Shortened by drought; clear of grass. *Marlborough:* Early planted doing very well; late planted will require a favorable season. *Newbury:* Owing to drought upland will not yield one-fourth of a crop; bottom and low island crops probably average. *Lexington:* Remarkably fine; yield probably 50 per cent. greater than last year. *Columbia:* Almost average. *Georgetown:* Late planted suffered from drought. *Chesterfield:* Reduced by dry spring.

GEORGIA.—*Muscogee:* Looks well, except in localities where drought has prevailed. *Forsyth:* Looks well, though worms are injuring it in places. *Chattooga:* Seasonable rains have improved the crop. *Columbia:* Without speedy rain the crop must be very short. *Quitman:* Average increased 10 per cent.; plants small, but healthy and well cultivated. *Effingham:* Crop will be good if rain comes soon. *Pulaski:* Poor prospect. *Lee:* Late rains are repairing somewhat the injury of the previous drought. *Schley:* Shortened 20 per cent. by drought. *Wilkes:* Corn planting delayed; crop injured by drought. *Murray:* Late seasonable rains in favor of the crop. *Walton:* Yellow Pennsylvania corn matured early. *Marion:* Injured by drought. *Gwinnett:* More forward than for many years. *Butts:* Early corn suffering from drought. *Oglethorpe:* Has not realized its early promise; earliest varieties are doing best. *Whitefield:* Promising. *Cobb:* Very fine. *Clay:* Will be 25 per cent. short. *Macon:* Much of the corn a total failure. *Merriwether:* Unpromising.

FLORIDA.—*Columbia:* Injured by drought. *Hillsborough:* Short. *Manatee:* In the eastern part of the county killed by drought. *Jackson:* Half a crop. *Bradford:* Doing well. *Alachua:* Drought has reduced corn to a half crop. *Gadsden:* Short 25 per cent. *Clay:* Increased attention to corn. *Wakulla:* Injured by spring freshet and summer drought; late showers may bring it up to half a crop.

ALABAMA.—*Lowndes:* Condition better than last year. *Conecuh:* Small, and not looking well. *Colbert:* Unusually promising. *Greene:* Crop will be good. *Pike:* Stalks short and color good, with fine shoots; weather very favorable. *Dallas:* Promising, but in danger of being slighted for cotton. *Butler:* Injured by drought. *Montgomery:* Average reduced 10 per cent.; aggregate yield will equal last year's. *Calhoun:*

Prospect full average. *Madison:* Best prospect in seven years. *Limestone:* Unusually well worked; in fine condition. *Clarke:* Suffered from drought and worms; but little left on stiff lands. *Autauga:* Backward and small, but looks well. *Lauderdale:* Fine condition; one good rain in July will finish the latest plantings. *Tuscaloosa:* Crop fine.

MISSISSIPPI.—*Wilkinson:* Better than for three years. *Wayne:* Indifferent stands. *Newton:* Very promising. *Grenada:* Crop promising where well cultivated; nearly matured in some sections. *Winston:* Crop better than for years; with seasonable weather the production of the county will be greater than its consumption; yellow Pennsylvania four or five weeks earlier than the native; possibly two crops of it might be made in the year. *Leflore:* Pennsylvania yellow planted March 15 yielded roasting-ears June 15; will mature three weeks earlier than native corn planted at the same time. *Madison:* Another good rain will make the largest crop since the war; late crops mostly failures from bad working. *Holmes:* Good prospect. *Tishemingo:* Crop prospects fine. *Noxubee:* Never more promising. *Neshoba:* Doing very well. *Yalobusha:* Promises to be 50 or 75 per cent. above last year.

LOUISIANA.—*Iberia:* Corn acreage 40 per cent, greater than ever before. *Red River:* On the bottoms finer than for years; not so good among the hills. *East Baton Rouge:* Very promising. *Richland:* Prospect better than for ten years. *Lafourche:* Acreage increased, and yield promises to be large enough to do away with the importation. *Morehouse:* Promises a very large crop. *Carroll:* Prospects very flattering. *Winn:* Fine promise. *Rapides:* A fair average; better than last year.

TEXAS.—*Fannin:* Promising; nearly safe. *Hardin:* Fine prospect. *Fort Bend:* 6,000 acres planted. *Liberty:* Crops 50 per cent. better than last year. *Red River:* Early corn mostly replanted; never looked finer. Pennsylvania yellow from the Department very fine. *Henderson:* Crop safe; better tillage than usual. *Ellis:* In full roasting-ear; crop fine. *Kendall:* Corn planted March 1 will average 40 bushels per acre. *Cherokee:* Late rain has placed the crop beyond danger. *Williamson:* Will average 45 bushels per acre. *Fayette:* Crop safe, and better than for years. *Milam:* Best crop for many years. *Rusk:* On high grounds corn needs rain, but looks well. *Harris:* An enormous yield expected. *Johnson:* Looks unusually well for the season. *Bexar:* Fine; hard enough to grind. *Colorado:* Best crops since 1869. *Upshur:* Crops very unequal. *Marion:* Crop 20 per cent. above the best past crop. Pennsylvania yellow in roasting ear; will yield 30 bushels per acre; Peabody 50, a week later. *Hamilton:* Crop clean and healthy, but low. *Medina:* Promises nearly an average crop. *Grimes:* Injured by hail. *Lampasas:* Promising. *Bell:* From 30 to 50 bushels per acre. *Matagorda:* Ruined by drought.

ARKANSAS.—*Craighead:* Crop retarded by rains. *Union:* Crop in the grass. *Sebastian:* Excessive June rains injurious.

TENNESSEE.—*Decatur:* Crops promising. *Hancock:* Looks fine; has been well cultivated. *Madison:* Drought did not affect, except to give a better chance to make it. *Wayne:* Remarkably fine. *Stewart:* Growing slowly; well cleaned. *Haywood:* Crops neglected. *Bradley:* Materially injured by drought. *Sevier:* Beginning to look fine. *Humphrey:* Average reduced 10 per cent. *Jefferson:* Rather above average. *Roane:* Fine condition. *Rutherford:* Backward, through neglect and cut-worms. *Hawkins:* Healthy and vigorous, though backward. *Davidson:* Late rains have made the crop luxuriant. *Sullivan:* Growing finely; promises a good crop; many fields several times replanted on account of cut-worms. *Macon:* Backward.

WEST VIRGINIA.—*Braxton:* The dry, cold spring put the crop back, and the worms destroyed some fields so that replanting was necessary, but it is now growing fast. *Upshur:* The cut-worm was so destructive that many fields were replanted the third time. Squirrels also took up considerable in fields bordering upon woodland. *Harrison:* Very backward, but doing well now. Early corn much damaged by cut-worm. *Cabell:* Condition good. *Fayette:* Doing very well now, but the weather was too cool for some time after planting, and afterwards too rainy for thorough culture. *Monongalia:* Very promising. *Monroe:* Much sod-land was broken up to increase the acreage, but the cut-worms were so numerous as to destroy the first planting, so that the crop is now backward.

KENTUCKY.—*Clarke:* Suffering from dry weather. *Hardin:* Looks well. *Fayette:* Promising. *Lincoln:* Backward, but of good color. *Pulaski:* Damaged somewhat by storms. *Hopkins:* Looking well *Carroll:* One of the best seasons ever known. *Anderson:* Rather backward, but in good condition. *Edmonson:* Rather late, owing to cold, wet spring, but now growing finely. *Clinton:* Not large, but color good and growing well. *Ohio:* Season favorable. *Russell:* Owing to dry weather in May the corn looked unpromising until the recent favorable season.

OHIO.—*Franklin:* Needs rain badly; on thin clay lands the rows are hardly discernable yet. *Ottawa:* Suffering from drought. *Butler:* Condition good, although planted nearly two weeks later than usual. *Adams:* On ground plowed previous to the freshet of April 15, the corn looks finely, but where the ground was broken up after that date, the cut-worm has been so destructive that some farmers have replanted the third time.

Scioto: Stands generally good, and looks well. *Geauga:* Backward, owing to late planting and cool weather at first, but a favorable season will insure a fair crop. *Pickaway:* Injured by drought. *Auglaize:* Very late, owing to the cut-worm; many fields replanted three times. *Holmes:* Backward and small until a recent rain and warm spell, owing to dry, cool spring. *Morrow:* Much above average, except in localities where the cut-worms have destroyed it. Some fields have been replanted two or three times. *Delaware:* Promises finely. *Crawford;* Doing well. *Brown:* Backward, owing to the ravages of the cut-worm, causing several plantings. *Athens:* Much retarded by cut and grub worms, but very clean and of good color. *Wood:* Prospect unusually good.

MICHIGAN.—*Wayne:* Never looked better. *Livingston:* Needs rain. *Lenawee:* Promises a full crop. *Washtenaw:* Doing well. *Clinton:* Injured by cut-worms; some fields destroyed. *Calhoun:* Acreage increased from year to year considerably. The condition has been much reduced by cut-worms, which are very much less destructive on fall-plowed land. *Mecosta:* Promises well now. *Cass:* Some fields plowed up on account of injury by white grub-worm. *Emmett:* The crows, blue-jays and chipmunks have taken every stalk in some fields, and reduced the total acreage 25 per cent. There would have been an increase in area but for their depredations.

INDIANA.—*Huntington:* The first planting destroyed by the cut-worm. *Randolph:* Worms very destructive. Much has been replanted twice. *Madison:* Very much injured by grub and cut worms. *Morgan:* Never looked better. *Pike;* Cut-worm and army-worm together with rain in May delayed and injured the corn. *Kosciusko:* Cut and grub worms have been very troublesome. *Noble:* Backward, owing to late planting and the ravages of the cut-worm. *Hamilton:* Small for the season, and much damaged by grub and cut worms. *Greene:* Acreage reduced by heavy rains, which prevented the planting of much of the flat land. *St. Joseph:* Generally looks well on sandy soil, but on prairie and clay lands damaged to the extent of one-half by grub and cut worms. *Brown:* Growing splendidly, and with a continuance of the present favorable season the crop will be the largest ever grown. *Cass:* Very clean, and coming on finely since the cut-worm ceased its ravages. *Steuben:* The cut-worm has been so destructive that many fields have been replanted several times, and some sowed to buckwheat and other crops. *Wabash:* Good on the bottoms, but drying up on high land. *Wells:* On clover sod, corn had to be replanted several times on account of the cut-worm, and is kept back by drought. *Marshall:* Some fields damaged by grub-worms. *Marion:* Suffering much from cut-worms and other pests. *Bartholomew:* Splendid prospect.

ILLINOIS.—*Marshall:* Fine prospect. Season good for cultivation. *De Kalb:* Two weeks late, but color good and growth vigorous, promising an average yield. *Sangamon:* Most fields clean and growing finely. Drowned out in some places along the river by the overflow in June, and, although replanted as late as June 24, may yet make a crop. *Stephenson:* Ten days later than last year, but stand good and growing finely. *Washington:* Looks well, but in some parts of the county it will be destroyed by the chinch-bug. *Will:* Less acreage, and the stand injured on newly-broken sod by the cut-worm. *Perry:* Would be in better than average condition but for the chinch-bug. *Fayette:* Will be seriously damaged by chinch-bugs if it continues dry. *Carroll:* On newly-broken ground the cut-worm has necessitated replanting. The weather rather cool till recently. *Macoupin:* Promises well. *Clinton:* Looks well now, but unless rain comes soon will be greatly damaged by the chinch-bug, which is now at work. *Mason:* Acreage planted equal to last year, but fully 5 per cent. lost by overflows, and the crop two weeks later than last year. *Bureau:* Not so forward as last year, but doing well. *Boone:* Very backward till June 15, but improving rapidly since. *Ogle:* Weather favorable and growth rapid. *Mercer:* Late, and drowned out on some bottoms. *Livingstone:* Indicates a lighter crop than last year. *Knox:* Growing very fast and nearly up to average condition. *Pope:* Suffering for rain. *Crawford:* Much damage threatened by the chinch-bug. *Effingham:* The destruction of the crop by the chinch-bug feared unless the remainder of the season should be rainy. *DeWitt:* If the season continues favorable the crop will be enormous; fields unusually free from weeds, &c. *Lee:* Backward, but growing rapidly. *Winnebago:* Growing rapidly. *McDonough:* Acreage fully up to average, and condition fine. The early part of the season was so wet that much flat land intended for corn could not be planted.

WISCONSIN.—*Portage:* Backward owing to cool weather in June. *Waukesha:* Stands well, and doing finely. *Douglas:* Continued wet weather delayed planting in some cases till June 25. *Washington:* The crop will be only moderate, owing to the rotting of a portion of the seed during the very rainy season. *Pierce:* Fully half the corn rotted in the ground, owing to the cold, wet weather. *Jackson:* Very poor. *Saint Croix:* Very backward until recently. Improving rapidly now, and may make a crop. *Green:* Late, and looking badly, but if the next two months are favorable we hope for a crop. *La Fayette:* Good stand, and growing finely. *Calumet:* Cold and wet at the time of planting, so that much seed rotted in the ground; the wire-worm also destroyed

much, and the replanted portions are not very thrifty. *Dunn:* Wet for corn, and much injury done by cut-worms and blackbirds.

MINNESOTA.—*Sibley:* Kept back by cool weather and rains. *Benton:* Has been somewhat backward, but now growing finely. *Ramsey:* Rather wet for corn. *Watonwan:* Poor. *Noble:* A considerable portion of the crop just coming up; it will take a late season to make a crop. *Sherburne:* Good stand, but backward and weedy. *Freeborn:* There will not be half a crop. The planting season was so wet that much of the corn-ground was seeded to oats and barley, and the stand was greatly injured by gophers, blackbirds, and the rotting of seed. The little that remains of the first planting looks well. *Murray:* Average condition. *Steele:* Backward, but growing finely now: *Meeker:* Was much injured by blackbirds, some fields being almost destroyed; condition otherwise good. *Houston:* The wet weather caused much seed to rot in the ground, and the depredations of gophers injured the stand also; but June has been very favorable, and the crop has come forward rapidly. *Nicollet:* Doing well. *Wright:* Very backward. Three weeks later than last year. *Wabashaw:* Very backward; stand poor; many fields plowed up and seeded to buckwheat. *Fillmore:* Backward, but growing rapidly.

IOWA.—*Clinton:* Since June 17 the season has been favorable, and, with a late fall, the crop may be good. *Cedar:* Cold, backward spring, followed by heavy rains, has set the corn back, and given a poor stand, but it is improving under the warm weather of the past ten days. *Chickasaw:* Planted late, but growing very rapidly. *Buchanan:* Backward from late planting and poor seed. *Tama:* Very poor stand, owing to wet, backward spring. *Muscatine:* Rapidly recovering from the effects of the wet, cold spell in May and June, but the grub-worm is still at work. *Scott:* Small and backward owing to late planting, but, with a favorable season, may yet make a full crop. *Pocahontas:* Acreage less than formerly, and the crop rather backward from wet weather. *Hardin:* Planting delayed from ten to twenty days by wet weather. *Howard:* Planting late, and growth retarded until June 16. Favorable weather since then. Much damage done by gophers. *Henry:* Growing finely except on low ground and sloughs, where it is a failure. *Linn:* Backward owing to the late spring, but growing well now. *Clayton:* Ten days late, and 15 per cent. washed out when too late to replant. *Pottawattamie:* Small for the season, but growing finely. *Des Moines:* A large portion of the crop was drowned out in May, and replanted in June; some as late as the 25th. *Lee:* Planting was continued as late as June 25; and much corn-land will still remain idle. The crop must be less than an average. *Marion:* Weather very favorable. *Polk:* Backward at first, but now growing rapidly, and promises a good crop. *Plymouth:* Has been kept back by cold, wet weather, but is growing well. *Iowa:* Small for the season, but looking well. *Shelby:* Much corn planted late, but the crop looks well. *Jasper:* Backward; cannot make over three-fourths of a crop. *Winneshiek:* Most of the crop was planted late, and it will require good weather throughout the season to make an average crop, as it is still small, though growing well. *Grundy:* Backward, but the stand and color good, and every indication of a heavy crop. We have millions of bushels of good old corn, which can be bought for 18 cents per bushel. What shall we do with it? *Mitchell:* Small, but growing fast, and promises well. *Hancock:* Rather backward, owing to cold rains early in the season, but doing finely now. *Monona:* Nearly ten days later in planting than last year, but favorable weather recently has brought the crop forward well.

MISSOURI.—*Lincoln:* Looks splendidly. *Charlton:* Planting delayed by rains, which also interfered with cultivation prior to June 15. *Jackson:* Well cultivated, and in excellent condition. *Moniteau:* Planted unusually late, and now threatened by drought as well as the chinch-bug. *Benton:* Excessive rains delayed planting and greatly injured corn in the ground. *Saint Clair:* Planting delayed by wet weather. *Caldwell:* Some planting done as late as June 20, and much low bottom land will remain unplanted, owing to very wet weather. *Carroll:* Needing rain, but yet the prospect is good; acreage greatly increased. *Grundy:* Continuous rains from April 20 to June 10 prevented the planting of much bottom land, and interfered with the working of hill-lands, so that the prospect is poor, especially as the chinch-bug has made its appearance. *Marion:* Larger acreage than usual, and condition good now, though the chinch-bug is in some fields. *Livingston:* Planted late, owing to backward season, but now in remarkably fine condition. *Reynolds:* Fine condition. *Cass:* Planted late, but looks well. *Daviess:* Acreage reduced 50 per cent. by continuous rains in the spring, and the crop backward. *Clay:* Planted late, but promises well. *Worth:* Does not look well, owing to a delay of three weeks in planting, caused by wet weather. *Nodaway:* The weather was so wet that corn was planted late, and on poorly prepared fields, so that it is backward now. *Harrison:* Planted late owing to wet weather, and growing slowly, with a prospect of much damage from the chinch-bug. *De Kalb:* The planting season extended from May 6 to June 22. Stand good, and receiving thorough culture. *Sullivan:* If the drought continues the damage done by the chinch will be great. *Cole:* Planted exceptionally late, and much land intended for it not planted. Stand good. *Johnson:* Attacked by the chinch-bug in some places.

KANSAS.—*Riley:* Increased acreage, caused partly by the failure of winter-wheat. *Leavenworth:* Fifteen per cent. of the land intended for corn could not be planted owing to wet weather, but the weather has been favorable of late, and a crop is expected. *Rice:* Looks well generally, though in some places there is complaint of injury by grasshoppers. *Wyandotte:* Planting late, owing to wet weather, but the crop coming on finely now. *Cowley:* Looks fine. *Osage:* Exceedingly small for the season. *Marion:* A little backward, but looks well. *Coffey:* Much planted very late, owing to wet weather. *Shawnee:* Uneven, but looks well. *Cloud:* Looks well, but needs rain. *Neosho:* Generally good, though some fields have suffered from the excessive rains, which prevented proper cultivation. *Douglas:* Planting retarded by rains, but prospect encouraging now.

NEBRASKA.—*Merrick:* Late, but good. *Hall:* Cold, backward spring, delaying planting a week, yet the stand is good, and with a favorable season an average crop may be made. *Washington:* The increase in acreage is owing to the influx of population. *Boone:* Acreage very large. *Cuming:* Somewhat late, but stand good and growing fast. *Nemaha:* Owing to the low price there was a decrease of acreage planted this spring.

CALIFORNIA.—*Contra Costa:* A slight increase in acreage, and looks well. Is raised only for roasting-ears, though it grows well upon rich and well-pulverized soil, without rain or irrigation. *Humboldt:* Only grown along the sea-coast for roasting-ears; in the interior the land too hilly for extended culture.

OREGON.—*Douglas:* Needs rain, but with a favorable season will make a good crop. *Columbia:* Sickly and yellow in appearance from continued cold sea-winds.

THE TERRITORIES.—*Santa Fé, New Mexico:* Very promising. *Minnehaha, Dakota:* The first stand was almost entirely ruined by excessive rains, depredations of birds, and from poor seed, so that the crop is small at this time. *Yuma, Arizona:* Not planted till after the overflow of the Colorado, in the early part of July. *Kane, Utah:* Some little complaint of injury by caterpillars.

WHEAT.

An improvement in the condition of wheat has occurred, since our last report, in New York, Maryland, Virginia, Michigan, Missouri, Kansas, and to a slight degree in some other States; while a small decline is reported in Ohio, and in some of the Southern States. The averages in the winter-wheat States stand as follows: Connecticut, 94; New York, 78; New Jersey, 69; Pennsylvania, 69; Delaware, 75; Maryland, 57; Virginia, 99; North Carolina, 112; South Carolina, 103; Georgia, 102; Alabama, 116; Mississippi, 108; Texas, 145; Arkansas, 106; Tennessee, 105; West Virginia, 95; Kentucky, 112; Ohio, 75; Indiana, 88; Missouri, 66. Of the States producing almost exclusively spring-wheat—Maine, 108; New Hampshire, 103; Vermont, 104; Wisconsin, 101; Minnesota, 110; Iowa, 108; Nebraska, 112; Oregon, 95; California, (which is not fully reported,) 120 for early sown, and 112 for late; Kansas, spring 95, winter 60; Illinois, spring 104, winter 92; Michigan, spring 98, winter 81. The average of condition for the United States is almost exactly the same as in June, or 94, 6 per cent. less than average.

The quality of the grain is uniformly superior. In the Middle States, in Ohio, Michigan, and Missouri, and wherever inferior condition is reported, the straw is short, but the heads are generally long and well filled, the kernel plump and heavy. The quality of southern wheat will probably prove as fine as any ever produced in that section. In threshing, the fullness of the heads, in proportion to quantity of straw, causes the yield to exceed the expectation, and may go far to offset the small decrease in reported condition. It is quite probable that the general excellence of the grain will make the present crop of equal value to that of last year. There has been almost entire exemption from rust, and comparatively little complaint of insects. The Hessian fly is reported in several places, more numerously in the Ohio Valley, and the chinch-bug has caused losses in many counties of Illinois, Iowa, and Missouri.

Several kinds of wheat distributed by the Department are proving desirable acquisitions. The Ushak variety has been sold in Virginia for $5 per quart. The Touzelle, a French variety, is claimed to be 20 per cent. better than any other in Culpeper, Virginia. The Fultz wheat is a very promising variety, though it has had but one year's distribution. The Tappahannock, first distributed nearly ten years ago, has been highly esteemed in various sections of the country, but appears to be declining at some points, as an old variety.

In Maine, only two counties send reports of condition less than 110. The great wheat county of Pennsylvania, Lancaster, which has yielded 2,000,000 bushels, stands at 75, while the State averages but 69. In Kentucky the figures in several prominent counties range from 110 to 133. The uplands of West Virginia are less favorably reported than the Kanawha Valley. Throughout the South, as shown in extracts from correspondence, the crop is better in quantity and quality than for many years. In Dallas, Texas, the yield is reported as ranging from 21 to 37 bushels per acre; in Williamson, from 25 to 35 bushels; in Blanco, 16 bushels, through the county, many of the fields producing 20 to 30 bushels per acre. In Tennessee similarly large yields are reported; in Knox County, from 27 acres 690 bushels of Tappahannock being thrashed, or nearly 26 bushels per acre. While the average for Ohio is low, Scioto County reports the best crop in twelve years. Throughout the Ohio Valley the harvest is late, many reports making it two weeks later than usual. The wheat-fields of Missouri have been devastated the present year by winter frost, by chinch-bugs, which have eaten whole fields of spring-wheat as fast as the plants appeared, by the Hessian fly, and by destructive floods which have deluged bottom-lands. A field of 7,000 acres, yielding 20 bushels per acre, is reported as the property of one farmer of Alameda County, California.

NEW YORK.—*Yates:* Crop prospects improved. *Jefferson:* Such winter-wheat as escaped winter-killing looks well. Spring grain on low land partly drowned out; on drier lands it is greatly improved; will be average. *Wyoming:* Promises 15 bushels per acre. *Steuben:* Winter-wheat about 78 per cent.; spring crop promising. *Genesee:* Two-thirds of a crop. *Cattaraugus:* Prospects favorable. *Dutchess:* Late rains have improved the crops. *Otsego:* Spring grain fine. *Livingston:* Winter-wheat past redemption on clay soils, but many fields have been greatly improved by late rains; crop less than half of last year's, which was the best in fifty years. *Queens:* Light; harvested in good condition. *Erie:* Winter-wheat looks well, but is spotted. *Onondaga:* Winter-wheat thinned by freezing, but doing finely now; heading heavily.

MAINE.—*York:* Growth rank.

NEW JERSEY.—*Morris:* Improved by late heavy rains. *Monmouth:* Grain of good quality. *Gloucester:* Yield 20 per cent. below average.

PENNSYLVANIA.—*Westmoreland:* Fultz wheat doing finely. *Franklin:* "Shelter weed" has taken the place of wheat, to a great extent, but it does not pay. *Lebanon:* Very short in straw; old Mediterranean the best; fancy varieties almost a total failure. *Cumberland:* Harvest two weeks late. *Lancaster:* Crop improved. *Bucks:* Short and thin, but of fine quality. *Luzerne;* Wheat that escaped winter-killing is 10 per cent. above average in condition. *Berks:* Stand thin, but heads large and filling well; crop about three-fourths of an average; harvest about 4th of July. *Bradford:* Improved by late warm and copious rains. *Mifflin:* Winter-killed; not over a half crop. *Tioga:* Winter-wheat better than was expected. *Fayette:* Half killed by winter and injured by the fly. *Clinton:* Winter-wheat a failure; or at most not over half a crop. *Clearfield:* Measurably recovered from winter cold; harvest late; fears of rust. *Indiana:* Promising. *Elk:* Greatly improved by late copious rains. *Northumberland:* Winter-wheat will yield double the estimate of the spring, or about half a crop. *Lehigh:* The wheat that came up has fine heads and is promising. *Lycoming:* Thin through winter-killing, but large-headed and greatly improved by late fine weather. *Butler:* Improved by late timely rains; crop half average. *York:* Well filled. *Montgomery:* Half a crop; shortened by drought.

MARYLAND.—*Baltimore:* Thin on the ground but well headed; no injury from insects or rust; crop about half average. Fultz wheat a great acquisition. *Talbot:* Not over a half crop. *Washington:* Scarcely four bushels per acre. *Montgomery:* Prospects

improving; straw short but heads well filled; some fields may average 20 bushels per acre. *Calvert:* Winter-wheat very greatly improved by the recent rains; crop will be better than for several years. *Queen Anne:* Straw short and light; quality of grain superior; probably not over a half crop.

VIRGINIA.—*Albemarle:* Short but well filled. *Clarke:* Prospects improved. *Mecklenburgh:* Light but of excellent quality; fly injurious in some places; ruined the Fultz wheat, which was very promising. *Nelson:* Crop short and light; heads unusually well filled; grain superior. *Washington:* More fly than last year; no rust yet; falling off 20 per cent. *Prince William:* Crop light. *Henrico:* Straw short but the crop average. *Prince George:* Of good quality and harvested in good order. *Surry:* Injured by drought. *Highland:* One-third of an average. *Fairfax:* Straw short but heads long and well filled; Fultz wheat a great acquisition. *Amelia:* Quality extraordinary; yield not large. *King and Queen:* Injured by hail-storm in May and also by drought. *Orange:* Greatly improved; promises a full crop of superior quality. *Culpeper:* Touzelle wheat, third crop from Department seed, is very fine; 20 per cent. better than any other. Fultz wheat promises finely. Ushak wheat has also created a sensation among farmers by the size and beauty of the heads; sold for seed at $5 per quart. *Pulaski:* Excellent in quality; three-fourths of a crop. *Charlotte:* Straw short but grain good; expect to thrash out a larger crop than for ten years. *Spottsylvania:* Yield 50 per cent. above last year; lands usually yielding 4 to 6 bushels yielded 10 to 12 per acre. *Middlesex:* Early harvest; grain fine but straw short. *New Kent:* Better than usual; grain finer than any raised since the war. *Madison:* Straw short; grain fine; Fultz wheat very successful. *Craig:* Wheat better than was anticipated; Fultz wheat from the Department is highly esteemed; stalk strong; head well filled. *Smythe:* Crop excellent and secured in fine condition. *Stafford:* Crop fine, making up in quality for its deficiency in quantity. *Greenville:* What little wheat was sown was harvested in fine condition. *Henry:* Crop never better. *Fauquier:* Crop short but of excellent quality. *Augusta:* Crop equal to last year's.

NORTH CAROLINA.—*Gaston:* Grain perfect; yield 8 or 10 per cent. above average. *Granville:* Better than any crop within the past ten years. *Forsyth:* Better than for five years; grain very fine. *Chowan:* Grain very good. *Alexander:* Fultz wheat looks well, but is late, and liable to rust; healthy so far. *Henderson:* Yield better than for fifteen years. *Mecklenburgh:* Crop better than any since the war, or for fifteen years. *Rutherford:* Harvested eight days earlier than usual; crop good, 30 per cent. above average. *Bladen:* Good yield. *Randolph:* Crop larger than for years and of very good quality. *Person:* Never better; will turn out 25 bushels per acre; harvested early and generally housed. *McDowell:* Better than for several years; harvested in good order, but in danger of being injured in the shock by continued rains; Fultz wheat has done remarkably well. *Caldwell:* Best crop, probably, since 1859; Boughton does not yield as well as blue-stem; Fultz promises to be a success. *Ashe:* Fultz looks well, as also spring-wheat. *Hereford:* Much better than was expected. *Haywood:* Better than for fifteen years. *Burke:* Largest yield and finest grain in ten years. *Davie:* Heads did not fill well, but grains large and good. *Alamance:* A fair average; grain very fine; shortened on thin soils by drought. *Stanley:* Thrashing out finely; grain bright, full, and heavy; yield larger than usual; all varieties have done well. *Rowan:* Remarkably full grains; yield larger than was expected; largest crop since the war. *Rockingham:* Crop double of last year's. *Lincoln:* Crop promises to be the best for many years. *Moore:* Fine, and mostly harvested in good condition.

SOUTH CAROLINA.—*Lexington:* Better than anticipated, especially the Fultz. *Union:* Wheat very fine; 64 pounds to the bushel.

GEORGIA.—*Forsyth:* Excellent in the grain, but thin on the ground. *Catoosa:* Fultz wheat did remarkably well. Two quarts of seed from the Department produced 1½ bushels, though sown on the poorest land on the farm. Nearly every head came out the same day, and the whole ripened with singular uniformity. It may, probably, on the best land, be made to yield from 25 to 40 bushels per acre. *Sumter:* Wheat found to be a profitable crop. *Gordon:* Grain extra fine; crop thin. *Wilkes:* Grain fine, but yield not up to expectation. *Lumpkin:* Ushak and Fultz wheat fully answer expectations; heads of Fultz very heavy. *Murray:* Best crop in ten years. *Gwinnett:* Good average. *Oglethorpe:* Under average. *Franklin:* One quart of Fultz wheat from the Department yielded 70 quarts. *Whitfield:* Crop good. *Lincoln:* Grain good, but the crop greatly reduced by winter-killing. *Fannin:* Winter-wheat fine. Fultz wheat from the Department did well; a quart of seed sown broadcast yielded a bushel of grain. *Cobb:* Crop good.

ALABAMA.—*Colbert:* Universally good. *Saint Clair:* Superior. *Morgan:* Best crop in eight years.

MISSISSIPPI.—*Newton:* Acreage small, but yield better than for ten years.

TEXAS.—*Fannin:* Yield over 20 bushels per acre. *Dallas:* Best crop ever raised here; averaging from 21½ to 37½ bushels per acre. *Red River:* Fine crop harvested. *Ellis:* Crop thrashing out from 23 to 41 bushels per acre; best crop ever made here. *Kendall:* Winter-wheat will average 20 bushels per acre. *Williamson:* Will average 25 to

35 bushels per acre. *Blanco:* Winter shortened by rust one-fourth; spring-wheat thrashed out 16 bushels per acre. *Johnson:* Yield larger than was expected. *Bexar:* Crop very superior. *Hamilton:* Finest crop ever raised, though somewhat thin on the ground. *Bell:* From 20 to 30 bushels per acre. *Lampasas:* Unusually good; average yield 22 bushels per acre; one farmer averaged 42 bushels.

ARKANSAS.—*Washington:* Acreage small; condition above average. *Madison:* Injured 10 per cent. by "spot."

TENNESSEE.—*Dyer:* Crop above average; from 15 to 25 bushels per acre; Red Chaff the favorite variety; matures early and grows luxuriantly; well suited to thin lands; very large and plump; said to yield more flour than any other variety; less liable to rust than any other yet tried. Fultz and Touzelle mature too late for the climate. *Rhea:* Crop of excellent quality; the best for ten years. *Smith:* Crop excellent as ever made in the county, and very abundant; proportion of grain to straw unusually heavy. *Decatur:* Crop good. *Hancock:* Harvested in good condition; best crop for several years. *Coffee:* Crop average and of excellent quality; 4½ quarts of Fultz from the Department yielded 8½ bushels. *Green:* Remarkably plump, and will thrash out heavy. *Monroe:* Some fields average from 33 to 36 bushels per acre; grain of the finest quality; others may not average above 4 bushels. *Fentress:* Extra in quantity and quality. *Madison:* Winter-wheat shortened 10 per cent. by rust. *Wayne:* Yield double of last year's. *Robertson:* In good condition and of good quality. *Stewart:* Best yield since 1865. *Bradley:* Excellent, but thin; seed defective. *Sevier:* Best crop since 1863. *Gibbs:* Better than for many years. *De Kalb:* Prospect fine. *Cannon:* Never better; 50 or 60 per cent. above last year. *Polk:* Fultz wheat has done well. *Jefferson:* Yield below average; quality fine. *Roane:* Fine, but thin on the ground. *Lawrence:* Best crop, both in quantity and quality, since the war. *Lincoln:* Twenty per cent. above average; heaviest crop in ten years; Fultz promises well, though it rusted worse than either the Walker or Boughton varieties; wheat will average 20 or 25 bushels per acre. *Rutherford:* Better than for five years; will average 12 bushels, some crops making from 20 to 25; grain excellent; acreage reduced 53 per cent. *Hawkins:* Best crop since 1863; harvest a week early; yield large and fine. *Hickman:* Yield greater than since 1861—16 bushels per acre. *Davidson:* Quality never better, but yield shortened by drought. *Sullivan:* Wheat greatly improved prior to cutting; many fields ruined by the fly; but on land well prepared and well manured heavy crops of extra grain were harvested; on many heads as high as 90 grains have been counted. *Macon:* Spring-wheat better than the winter crop; earliest varieties the best; winter-wheat thin on the ground, but well headed. *Knox:* Boughton wheat yielded 690 bushels on 27 acres. A gallon of Fultz wheat from the Department, sown on one-tenth of an acre, yielded 5 bushels; grain splendid.

WEST VIRGINIA.—*Braxton:* Crop very good; thin in some places, but well filled, and of fine quality everywhere. Harvest commenced June 22. *Berkeley:* Better filled than for years. *Putnam:* The crop rather above average; not very good on uplands, but better in the valley of the Great Kanawha. Tappahannock generally sown, but does not yield as much as Lancaster or Mediterranean. Every variety "runs out" if continuously planted. The midge rather more troublesome than usual, but has not materially damaged the crop. *Tyler:* The crop very variable in different localities and exposures. On good uplands the yield will be satisfactory, but on some of the bottoms not a fourth of a crop will be made. Drilling and plowing in are the only security against winter-killing. *Morgan:* Harvest nearly over, and although the wheat is thin, it is so well filled that the yield will be a full average. *Harrison:* Well filled, but the crop below an average. *Cabell:* Acreage much reduced by drought last fall, but the quality better than for years. *Kanawha:* Never better headed. *Jefferson:* Harvest over; straw light, but heads well filled with good grain. The Fultz variety splendid. *Monongalia:* The yield will be about one-third of last year's; quality good. *Monroe:* Some injury from the fly, but many crops above average.

KENTUCKY.—*Clarke:* Best crop for eight years past. *Shelby:* Wonderful improvement in the crop from seasonable rains; no increase in acreage, but the yield will be 25 per cent. above an average of the past six years. Harvest nearly over. *Taylor:* Harvest progressing and the grain uncommonly large and fine. One quart Fultz wheat sowed October 1 and cut June 20, yielded one bushel of splendid grain after a loss of 10 per cent. from winter-killing. *Hardin:* The Fultz wheat has matured well and has very large, long heads. A yield of three bushels is expected from one quart of seed. *Fayette:* Small area sown; quality of berry unsurpassed. *Warren:* Harvest just over; acreage 20 per cent. below average, but quality very superior. *Lincoln:* Remarkably good; grain large and sound. *Pulaski:* Harvest over. *Mercer:* Best crop since 1855; acreage much less than last year, but the grain very heavy and well filled. The Fultz variety, sown September 20, stood the winter well, and grew vigorously in the spring; heads good and well filled for two-thirds of their length, but the rest of the way with small and imperfect grains. We think acclimatization will obviate this objection. *Owen:* Crop below average from winter-killing and the ravages of the midge. *Hopkins:* Extra crop. *Spencer:* Acreage 30 per cent. less, but quality 25 per cent. better and yield

100 per cent. greater than in 1871. *Butler:* Better than for many years; harvest over. *Carroll:* Winter-wheat badly frozen out. Quality will be good if not injured by wet in the shock. *Anderson:* Harvest nearly over and the finest crop since 1855. *Hart:* Yield average; quality never better. *Edmonson:* Decrease in acreage but condition fine. *Clinton:* Crop very fine; large heads, plump grain, and no rust. *Ohio:* Yield more than double that of last year. *Russell:* The crop will be three times that of last year, and 25 per cent. above an average. A few fields injured by rust. *Nelson:* Excellent crop; berry very fine. *Scott:* Late wheat reduced 25 per cent. by the midge. *Henry:* More than an average crop; harvest nearly over.

Ohio.—*Logan:* Winter wheat has had a succession of adverse circumstances to contend with. An unusually dry fall prevented sufficient growth to protect the roots during the winter, and it was therefore exposed to the dry, cold winds, which injured without actually throwing it out, so that farmers were encouraged to hope that it might revive, until it was too late to break up so large a breadth of land for other crops. I think it safe to estimate that 40 per cent. of the winter-wheat will not pay for harvesting. Where the wheat was turned under, corn, oats, and beans were substituted. *Miami:* The crop will be 75 per cent. of an average. It has filled well, and where it escapes the fly will make a full crop. *Medina:* Has improved very much within the past month, and now promises 80 per cent. of an average crop. *Vinton:* Hard winter; fly and weevil will reduce the crop more than one-half. Fultz and Australian spring wheat promise well. *Franklin:* Ruined by drought on clay lands where not in good condition. *Butler:* Harvest commenced June 25, and will be over by July 5. Forty years ago it was never begun before July 4. The product will vary from 3 to 30 bushels per acre. *Adams:* Filling well, but very thin; many fields not being worth harvesting; others, however, will produce an average crop, and we will probably have nearly as much in the aggregate as last year, which was about half a crop. *Coshocton:* Harvesting not commenced. Last year it was over by July 1; we do not expect more than a return of the seed sown. *Ross:* Invariably good on low and poor on high lands; harvest commenced. *Scioto:* Best crop for twelve years. *Pickaway:* Two or three seasonable rains in June have improved the prospect of the crop. The straw is thin but the heads well filled and quality of grain excellent. *Highland:* Harvest fairly commenced. Straw light, but good-sized heads and plump berry. *Morrow:* Some improvement within the past month in fields not plowed up and seeded to other grains. *Delaware:* Injured by dry weather in June. *Brown:* Not injured by the drought; now in harvest. *Lorain:* Rusting in some localities. *Huron:* Winter-wheat very good. *Athens:* Very light crop but grain plump. *Wood:* Will probably be little over half a crop, but of good quality. Favorable weather since the 1st of June has improved the prospect much. *Columbiana:* Has turned out much better than was anticipated.

Michigan.—*Bay:* Winter-wheat on both high and low lands was frozen out to a great extent, but where it escaped looks very well. *Wayne:* Thin on the land, especially in clay soils, but has improved wonderfully. *Livingston:* Thin on the ground and rank in growth; consequently likely to rust. *Lenawee:* Crop shortened by dry fall and severe winter. *Washtenaw:* Twenty per cent. below average. *Clinton:* Badly winter-killed, but improved remarkably in June. *Calhoun:* Harvest from ten days to two weeks late. *Lapeer:* Light crop, though it has improved much within a month past. *Macomb:* Where winter-wheat was not entirely killed out, it has improved wonderfully. *Cass:* Harvest at hand. Excellent berry, but some smut and weevil. *Shiawassee:* Much improved by recent rains, and a prospect of 75 per cent. of an average crop. Harvest two weeks late. *Monroe:* Thin, but remarkably well headed.

Indiana.—*Floyd:* Unpromising till recent rains, which have brought it up to an average. *Warwick:* Better crop than for twenty-five years. *Madison:* Poor. *Orange:* Has improved beyond expectation since June 1, and four-fifths of the crop harvested in good condition. *Switzerland:* Forty per cent. below average, owing to winter-killing from lack of snow. *Vanderburgh:* Reports of injury from the army-worm and bug appear to have been unfounded. *Morgan:* Has improved remarkably and promises a full crop. *Pike:* Very fine. *Kosciusko:* Damaged by hail in some places. *Noble:* Generally well headed, but the crop will be 40 per cent. below average. *Hamilton:* Harvest commenced June 25; well filled and of fine quality. *Saint Joseph:* Will be an average crop; ready to harvest by July 5. *Clarke:* Was thin through the winter, but has a good head and is well filled. *Brown:* Thin, but well headed and filled with excellent grain. Will all be harvested within a week. *Cass:* In the midst of harvest. Grain good and straw bright. *Parke:* Quality of the crop very good, though considerable damage has been done by the midge, which has been heretofore unknown. *La Grange:* Many fields plowed up and bare spots in those remaining, but the heads are unusually long and what remains promises well. Harvest two weeks later than last year. *Gibson:* Harvest over. Quality, yield, and condition good. *Wabash:* Half through harvest. The heads well filled. *Marshall:* Harvest commenced. The crop reduced 15 per cent. by the fly. The Fultz wheat looks well. *Marion:* The crop will be above an average, owing to favorable spring weather; no rust or insect enemies.

Starke: Drought has injured spring-wheat very much. *Posey:* The crop will be nearly double that of last year.

ILLINOIS.—*Madison:* The chinch-bug has recently appeared in great numbers, reducing the quality and quantity of the crop 20 per cent. *Marshall:* Quality excellent, but yield 50 per cent. below average. *De Kalb:* Very fine, but the danger to spring-wheat from chinch-bugs not yet over. *Lawrence:* Harvest nearly over; heads well filled, but thin on the ground; considerable damage done by fly and chinch-bug. *Washington:* Harvest nearly over, and crop good. *Perry:* Harvest over; crop good in the western part of the county, but much damaged by chinch-bug in the eastern portion. *Fayette:* Crop unexpectedly good, little damaged by the chinch-bug. *Macoupin:* About half the wheat cut; probable yield 10 bushels per acre; quality good. *Clinton:* Winter-wheat all cut, and thrashing will commence immediately; nearly every field injured by the chinch-bug, which would have done far more damage but for heavy rains, which checked them for a time. *Saint Clair:* Ripened late, and it is feared will not turn out as well as was anticipated before harvest. *Putnam:* Winter-wheat badly frozen out, and very little spring sown, owing to the damage it sustained from the chinch-bug last year; not enough wheat raised in the county for bread. *Ogle:* Spring-wheat somewhat lodged by a recent storm, but if not more seriously injured will yield more than an average crop. *Union:* Unusually favorable harvest. *Clark:* In spite of some complaints of Hessian fly and chinch-bug the crop will be above an average. *Rock Island:* Some danger from lodging; if it escapes that the crop will be above average. *Pike:* Condition has improved fully 20 per cent. in the past three weeks; heads large and well filled. *Kankakee:* What little winter-wheat there is promises very finely. *Pope:* Excellent crop, and harvested in good condition. *Montgomery:* The yield will be about half an average crop, but the quality excellent. *Crawford:* There has been a great improvement in the crop since June 1, and the yield will be an average and the quality excellent. *De Witt:* The crop has improved remarkably, and although the stand is light the quality will be first rate, and yield greater than seemed possible a month ago. *Lee:* Prospect fine, the only fear being from lodging. *McDonough:* Promises a greater than average yield.

WISCONSIN.—*Portage:* Both winter and spring wheat heavy; the latter extra. *Waukesha:* Spring-wheat sowed four weeks later than the average time, but has done admirably; is heading June 25. *Fond du Lac:* Drought has reduced the expectations held out in June. *Saint Croix:* An extra crop expected. *Green:* Spring-wheat looks very well, but we hear complaints of the chinch-bug. *La Fayette:* Prospect good. *Calumet:* Winter and early-sown spring-wheat look pretty well, but the drought has damaged what was late sown, and if rain does not come soon, not much over half a crop will be raised. *Dunn:* Favorable season for a crop.

MINNESOTA.—*Sibley:* Winter-wheat looks well. It does well only in timber-lands. *Watonwan:* Spring-wheat in fine condition. *Sherburne:* The wet, cool weather has been favorable. *Murray:* Never looked better. *Steele:* First rate crop. *Meeker:* Looks finely, though somewhat lodged. *Houston:* Unusually fine. *Faribault:* Not so forward as usual. The white Australian wheat looking finely; heads large and long. *Wabashaw;* Promises well. *Fillmore:* Winter-wheat entirely frozen out; spring promises a fine crop.

IOWA.—*Montgomery:* All the winter-wheat in the northern part of the county killed by freezing. Some fields in the extreme southern portion will yield a fair crop. *Chickasaw:* Never looked better, but there are some reports of rust having attacked it. *Buchanan:* Some fields badly lodged. The growth very heavy. *Muscatine:* Spring-wheat never looked better; thick on the ground, and well filled. *Scott:* Growing luxuriantly. *Pocahontas:* More wheat and less corn grown than formerly. Crop looks well. *Howard:* Doing well. *Clayton:* The prospect finer than at any time since 1860. *Mahaska:* Spring-wheat looks well now, but the chinch-bugs are at work upon it, and may ruin the crop. *Johnson:* Spring-wheat looking well, though two weeks late, and not out of danger of rust. *Lee:* Winter-wheat considerably damaged by the Hessian fly, and by drowning out on flat-lands, but will still be 90 per cent. of an average crop. The winter and spring were very hard on it; and but for the general use of the drill there would not have been one-fourth of a crop. *Marion:* Winter-wheat very nearly ruined by winter-killing, rust, and chinch-bugs, which latter pests have also attacked spring grains. *Polk:* Spring-wheat somewhat rusted early in the season from excess of rain, but has recovered, and is in good condition. *Plymouth:* Winter-grain so frozen out as not to be worth harvesting. *Iowa:* Spring-wheat promising. *Shelby:* We have the best prospect for spring-wheat ever seen. *Grundy:* Now in bloom, and promises a heavy crop. *Mitchell:* Spring-wheat has seldom looked better, though grain crops are never certain until cleaned and measured. *Hancock:* Never better. *Monona:* Uneven in places, but some of the finest fields ever seen.

MISSOURI.—*Saint Louis:* Yield 70 per cent. of last year's; quality 10 per cent. above average. Harvest over. *Putnam:* About ready to cut; some fears of injury from the chinch-bug if the dry weather continues. *Lincoln:* Almost an entire failure, in the western part of the county, from winter-killing. Some fields in the timber-lands of

the eastern part are nearly up to average. *Platte:* Winter-wheat almost a total failure from the severe winter and the ravages of the grub-worm in the spring. *Barton:* Winter-wheat almost a failure. *Carter:* Harvest over. The Tappahannock is very fine, but other varieties are not so good. The Fultz a perfect failure. *Jefferson:* Harvest about over. The crop badly winter-killed in some localities, and much injured by the chinch-bug. *Moniteau:* A failure; few farmers will harvest any. *Saint Clair:* What little survived the winter is being destroyed by the chinch-bug. *Caldwell:* The crop almost a failure, the chinch-bug injuring the little remaining. *Carroll:* Spring-wheat very fine, and the small portion of winter-wheat that is left is in good condition also. *Wayne:* Good in yield and quality. *Macon:* Nearly all the winter-wheat was frozen out, including the Fultz variety. The crop of the county will not be half an average one. *Grundy:* Ninety per cent. of the winter-wheat frozen out. The county will not raise the equivalent of seed sown. *Lewis:* Many fields plowed up. The chinch-bug has taken the spring-wheat as fast as it came up, and the Hessian fly has been very numerous. *Marion:* Harvest now in progress, and the quality of the grain very fine. The poor appearance in the spring caused many to plow up their fields, but the spring-rains improved the prospect much. *Montgomery:* In some localities it has been injured by the chinch-bug. *Livingston:* Injured by unfavorable winter and backward spring. *Reynolds:* The crop injured by the chinch and a small white worm which cuts the straw near the ground. *Cass:* Mostly plowed under; thin where standing. *Clay:* Winter-wheat almost a failure as to yield, and of poor quality. The little spring-wheat sown looks well. *Nodaway:* Spring-wheat promises finely. *Dade:* All destroyed on bottom lands by a great flood May 29. *Jasper:* A loss of 10 per cent. will be sustained from premature harvesting to escape the chinch-bug. *De Kalb:* Very poor crop; hundreds of acres plowed up and planted in corn, and some of those remaining will not be cut. *Perry:* The Fultz wheat did not do very well. *Iron:* Quality excellent and quantity above average, though the Hessian fly and chinch-bug have destroyed some fields. The Fultz wheat was sown in September and ripens early, and promising to be an improvement on the Tappahannock. *Dallas:* Considerably damaged by the chinch-bug. *Sullivan:* Harvesting will be done from July 10 to 20. *Hickory:* Not one-fourth of a crop. Many fields not worth cutting. The dry fall made sowing late, and much was winter-killed; the chinch-bug also did much injury in some localities. *Cole:* Scarcely a third of a crop, owing to winter-killing. *Barry:* Has improved since June 1; the heads well filled with good grain. *Johnson:* Very light, and many fields plowed up and planted in corn, owing to winter-killing and ravages of the chinch-bug in the spring. *Phelps:* Winter-killed badly, and thin on the ground, but well headed and filled with grain of superior quality. *Pemiscot:* Little wheat raised, owing to the frequent overflow of the Mississippi. It grows well when not flooded.

KANSAS.—*Marshall:* The fields of winter-wheat that were not resown to spring-wheat have produced full, plump grain, but the yield is very little, owing to winter-killing. Spring-wheat promises considerably more than an average crop. *Brown:* Small acreage of spring-wheat sown, owing to scarcity of seed and fear of the chinch-bug. The condition of the crop was never better, with few bugs so far. *Riley:* Winter-wheat a failure, and some of the land planted in corn. Spring-wheat very promising. *Linn:* Winter-wheat badly frozen out, but what remains looks well. The chinch-bug has injured a portion of the little spring-wheat grown. *Leavenworth:* A failure. *Woodson:* Not one-fourth of a crop. *Wyandotte:* Winter-killed to a very great extent. Plowing or drilling in the seed is considered the best means to prevent freezing out. *Cowley:* Better than was anticipated in the early spring, standing thicker, and well filled. The Australian wheat was blasted by rust; the Fultz looks well. *Miami:* Winter-wheat almost entirely winter-killed; spring light as usual, owing to the damage done by chinch-bugs. *Osage:* Almost a total failure. *Labette:* Fine crop. *Marion:* The little winter-wheat that was not frozen out has been harvested. *Coffey:* Winter-wheat about half a crop, though of extra quality; spring-wheat now being cut. *Lyon:* Condition good; little winter-wheat in the county; harvest twelve days later than last year. *Shawnee:* Winter-wheat almost an entire failure; spring injured by the chinch-bugs in many localities. *Cloud:* The berry very fine, but thin on the land. *Neosho:* Harvest four weeks later than last year; stands very thin, but quality of grain good; some late fields injured by the chinch. *Cherokee:* Much better than was thought possible in the early spring, and many fields, which were thought worthless then, will produce six or eight bushels per acre; harvest two weeks later than last year. *Wilson:* Winter-wheat very poor, owing to late sowing, dry fall, winter-killing, and chinch-bugs; spring-wheat utterly destroyed by the chinch, including the Australian white from the Department.

NEBRASKA.—*Hall:* The Australian spring-wheat very promising. *Gage:* The Fultz wheat received and sown too late, and all frozen out; should have been sown in August. *Cuming:* Good prospect for a heavy crop; some red rust, but no apparent injury. *Dakota:* Fine prospect, but fears of lodging, as the weather is wet. *Thayer:* Prospect not much injured by the chinch-bug. *Nemaha:* Winter-wheat generally win-

ter-killed and the land put in other crops; spring promises a heavy yield, but not so much sown, partly owing to the scarcity of seed.

CALIFORNIA.—*Placer:* Harvest has commenced, and a bountiful crop will be saved, of excellent quality; the acreage is largely in excess of former years. *Contra Costa:* Excellent on sandy soils where early sown, and only slightly below an average on heavy soils sown late; the cool weather has been favorable. *Alameda:* Neither yield nor quality so good as was expected, owing to drought in some sections and rust in others. I have seen 7,000 acres of wheat in one field, the property of one man, which will average 20 bushels per acre, and upon an adjoining ranch they were cutting, thrashing, and sacking for market 65 acres per day. *Nevada:* Rather light. *Lake:* Nearly a failure; poorest crop since 1859. *Mendocino:* Better than was expected a month ago. *Amador:* An average crop. *Stanislaus:* The yield is better than was expected, and will be about 14 bushels per acre. A large increase in acreage will make the total product greater than any previous crop.

OREGON.—*Linn:* Fall and winter-sown wheat rather above average, but the recent drought and hot northerly winds injured spring-wheat. *Douglas:* Winter-wheat short and thin from the wet winter, and cold, dry spring.

THE TERRITORIES.—*Morgan, Utah:* Fifty per cent. of spring-grain destroyed by the grasshoppers. *Santa Fé, New Mexico:* Both winter and spring doing well. *Lewis and Clarke, Montana:* Finer than usual.

COTTON.

The past month has been generally favorable to cotton. Limited areas have been affected by drought, but rains were quite general during the latter part of June. On the Atlantic coast showers have been so frequent and heavy, since June 20, as to delay cultivation and promote the growth of weeds and grass. Before that date a season of comparative drought of seven or eight weeks had been suffered in a portion of this district, while other counties represent the weather as having been uniformly favorable.

The variation in rainfall during the past month has been considerable in the Atlantic States, ranging as follows at the stations reported: from 1.2 inches to 4.95 in Virginia; from 1.75 to 5.49 in North Carolina; from 1.4 to 3.95 in South Carolina; from 1.25 to 4.96 in Georgia; from .4 to 6 in Florida; and from 1.55 to 4.89 in Alabama. In the States of the Mississippi the rainfall has been abundant, the lowest records in the several States being from 2 to 4 inches, and the highest from 4.5 to 11. In Tennessee the range is from 2.64 inches to 10.63; in Louisiana, from 4.35 to 11; in Texas, from 2.2 to 6.9; in Arkansas, from 4.3 to 8.2.

The States making averages lower than 100, the standard of good condition, are Virginia, North Carolina, and South Carolina, in which the average rainfall in May and June was light, and Arkansas, where injury has resulted from heavy and unseasonable rains. In all the other States the averages are above 100. The averages are as follows: Virginia, 96; North Carolina, 94; South Carolina, 97; Georgia, 101; Florida, 102; Alabama, 106; Mississippi, 109; Louisiana, 103; Texas, 105; Arkansas, 95; Tennessee, 104. Taking into consideration the relative importance of the States, in production, the general average of condition would be 103. As a whole, the July returns of the present year present a higher average of condition than those of any previous reports except those of 1868.

Of the 55 counties reporting cotton in Georgia, in 19 condition is below 100, in 21 above, while 15 return 100. Decatur, first in cotton-production, producing 48,000 bales in 1869, or one-tenth of the crop of the State, is placed at 100, Bibb and Warren 110, and less important counties 120 and 125.

The first cotton county in Alabama, Montgomery, stands at 100; Dallas, 110; and Wilcox, 100—three counties which produce one-sixth of

the crop of the State; other counties of considerable importance at 120 and 125.

In Mississippi some of the principal counties report high condition: Hinds, 125; Madison, 120; Yazoo, and several others, 110; Washington stands at 90.

Fayette, in Tennessee, in 1869 producing 20,000 bales, is reported at 110; and Giles, a prominent county, is put at 110.

Tensas Parish, in Louisiana, yielding 25,000 bales in 1869, and producing in 1859 the unequaled crop of 141,000, though there were but 117,000 acres of improved land in the parish, is reported at 110; East Feliciana, 120; East Baton Rouge, 105; Concordia, Claiborne, Rapides, and other principal parishes, 100; and Caddo, yielding 26,000 bales in 1869, at 95.

Very little complaint is made of injuries by insects. The *aphis* is reported in several counties of the Carolinas; and the "cotton-worm" is mentioned in Texas.

The following extracts from correspondence will further illustrate the subject:

VIRGINIA.—*Surry:* Culture increasing. *Prince George:* Cotton taking the place of peanuts.

NORTH CAROLINA.—*Gaston:* Crop late, and has not grown well till within a week. A fair season will make an average yield. *Bertie:* Late, but looking well; there will be but few, if any, blossoms on the 4th of July. *Wake:* Too much rain; but little prospect of an average crop. *Pitt:* Cotton badly in the grass and seriously injured. *Lenoir:* Wet weather has made the grass very troublesome. *Mecklenburgh:* Cotton looks finely where planted before the 15th of April; later plantings not so good; season good for working; blossoms by the 15th of June, earlier than ever before known. A good season will make a splendid crop. *Bladen:* Growing finely, but four weeks behind time; lice beginning to show themselves; last year they were the forerunners of rust; crop cannot be average. *Greene:* Bad stand; drought at planting caused the seed to remain in the ground from four to six weeks; condition of plants, 20 per cent. below par. *Onslow:* Looking well and growing finely; almost three weeks later than last year. *Hertford:* Crop small, but thrifty; exceedingly fine weather will be necessary for a full crop. *Beaufort:* Crop has suffered; on ill-drained lands not over a third of a crop; stand generally imperfect; cut-worms at work; this especially true in the case of lands that have long been in cotton. *Jones:* Cotton small, but promising. *Alamance:* Good. *Stanley:* Blooms plenty. *Rowan:* Condition excellent. *Lincoln:* Season fine for cotton. *Moore:* Backward through depredations of lice and cold nights. *Craven:* Generally a bad stand through unfavorable weather; plants small, but healthy. *Franklin:* Very grassy through excess of rain. *Currituck:* Acreage increased; growing finely. *Perquimans:* Started with an excellent stand; cold nights during the first half of June reduced it; now not over two-thirds, and full of lice. *Edgecombe:* Cotton a failure, through drought at seeding-time and excess of rain afterwards, producing grass and weeds.

SOUTH CAROLINA.—*York:* On light loam soil cotton was out of the ground early; in clay soil the plants are late, and delayed by dry spring. The former class above average, and the latter below. *Fairfield:* Below average on account of drought and late planting. *Claxendon:* Promising, though late planted; generally infected with lice. *Orangeburgh:* Suffering from lack of moisture; crop clean. *Marlborough:* Early planted doing well; late planted will require a favorable season; lice on late plantings. *Newbury:* Cotton small and backward from late re-plantings; early stands look well. *Anderson:* Poor and late stand. *Lexington:* Improving; promises to excel last year's crop. *Columbia:* Stand imperfect, but prospects almost average. *Chesterfield:* A little better than usual, where fertilizers are used; where not used, the crop is far below average.

GEORGIA.—*Muscogee:* Backward in many localities, though improved by late rains. *Liberty:* Short cotton supplanting the long staple and finer cottons even on the coast; farmers working hard for a good crop. *Columbia:* Doing well. *Harris:* Cotton planting delayed and restricted by drought in April; stand imperfect. *Quitman:* Crop has been well cultivated and looks well. *Worth:* Drought greatly injured cotton; much did not come up; much that did come up died; $1 per bushel is now offered for cotton-seed, the usual price being about 10 cents. *Sumter:* Condition varied; where rain has been abundant the crop looks well; where rain has been deficient crops are very poor. *Wilkinson:* Shortened by drought; not a good stand. *Effingham:* Looking well. *Pulaski:* Prospect fine; crop clean; will be a full average. *Glynn:* Crop has

improved greatly, and is now doing well. *Lee:* Generally cleaned and of average promise. *Schley:* Looks well in spite of drought. *Wilkes:* Cotton-planting late, but this no disadvantage. *Marion:* Not injured by drought. *Gwinnet:* More promising than for many years; bloom 8 or 10 days early. *Oglethorpe:* Fertilized cotton doing remarkably well. *Lincoln:* Promises a good yield. *Macon:* No progress in three weeks. *Cobb:* Very fine. *Clay:* Promises a fair yield. *Laurens:* Largely failed to come up. *Meriwether:* Prospect remarkably good.

FLORIDA.—*Columbia:* Looks well, though the stand is imperfect. *Hillsborough:* Doing well. *Jackson:* Two weeks ahead of last year; promising with present weather. *Bradford:* Doing well; prospect better than any for ten years. *Alachua:* Recent rains have enabled cotton to overcome the evil effects of previous drought. *Gadsden:* Early-planted cotton in good condition; stand, however, imperfect; late cotton imperfect; may make two-thirds of an average. *Orange:* Long drought has injured cotton. *Wakulla:* Promising.

ALABAMA.—*Conecuh:* Great improvement on account of rains; first bloom June 4. *Colbert:* Crop looks well. *Pike:* Rarely, if ever, better cultivated; prospects fine. *Dallas:* Growth fine with excellent season. *Butler:* Doing finely. *Blount:* Promises a large crop. *Montgomery:* Promise above last year. *Calhoun:* Prospect full average. *Madison:* Best prospect in seven years. *Limestone:* Crop unusually well-worked and in fine condition. *Clarke:* Growing finely where well-worked; may be two-thirds of a crop. *Autauga:* Cotton backward, but in good condition. *Lauderdale:* In fine condition and growing fast; commenced blooming June 12; is in good cultivation. *Tuscaloosa:* Crops well-worked are doing well. *Franklin:* Cotton late planted, but bloomed June 22, about ten days earlier than usual; prospects fine,

MISSISSIPPI.—*Hancock:* Cultivation decreasing. *Warren:* Stand and condition improved. *Wilkinson:* Much of the crop grassy and growing too fast; running to leaf more than it can hold when drought sets in. *Wayne:* Better condition than last year, though later in gaining a stand; first blooms June 23. *Newton:* Better than for eight or ten years; acreage increased 10 per cent.; condition improved 50 per cent. over last year. *Grenada:* Cotton improved, but the stand very irregular. *Winston:* Early-planted cotton doing well; late planted very small. *Holmes:* Prospect good; too much cotton. *Clark:* Heavy rains give rise to fears that cotton will run to weed. *Tishemingo:* Crop prospects fine. *Noxubee:* Early-planted cotton promising. *Neshoba:* Doing very well. *Yalabusha:* Stand good; cultivation superior; promises more flattering than at any time since the war; blooms earlier, though planting was later than last year.

LOUISIANA.—*Red River:* Bad condition. *Richland:* Best prospect in 10 years. *East Baton Rouge:* Very promising. *Moorehouse:* In good condition. *Cameron:* Worms are at work. *Carroll:* In better condition than for several years. *Tensas:* Probably the largest crop since the war. *Winn:* Above average promise. *Concordia:* On good land the crop is growing rapidly; on "buck-shot" land it is smaller. *Rapides:* Better than in six years. *Claiborne:* Cotton superseding wheat and sugar-cane.

TEXAS.—*Fannin:* Promising; will be in blossom in fifteen days. *Hardin:* Heavier crop, probably, than since 1861; looks fine; some little show of worms. *Fort Bend:* 4,000 acres planted; 3,000 bales made last year; the stalks already average fifteen grown bolls each. *Victoria:* Cotton-worm appeared June 6. *Liberty:* Cotton growing well, but the worm has made its appearance in larger numbers than usual. *Red River:* Cotton promising. *Henderson:* Cotton growing fast. *Ellis:* Weather fine for cotton. *Kendall:* Acreage small, but crop promising. *Williamson:* Looks well. *Fayette:* Quite promising. *Milam:* Best crop for many years. *Smith:* Unusually healthy. *Johnson:* Looks well. *Bexar:* Fine. *Colorado:* Best crop since 1859. *Upshur:* Behind last year's crop. *Titus:* Better than for several years. *Rusk:* Looks well; better than last year; a single rain within ten days will carry it through July and August. *Grimes:* Hail-storms killed the young cotton in the western part of the county. *Bell:* Unusually promising, but the heavy rains are exciting fears of the worm.

ARKANSAS.—*Craighead:* Crop delayed by rain. *Union:* Crop in the grass. *Sebastian:* Fifty per cent. greater acreage in cotton than last year; injured by excessive June rains. *Crittenden:* Small and late in coming up. *Columbia:* Crop grassy, but partly cleaned, and looking well; stand good; crop promises to be heavy.

TENNESSEE.—*Decatur:* Crop promising. *Madison:* Small; drought after planting. *Wayne:* Looks fine. *Haywood:* Two weeks later than last year; grassy; acreage increased 10 per cent. *Gibbs:* Very promising. *Rutherford:* Acreage increased 15 per cent.; stand good and plants in good condition.

UTAH.—*Kane:* By extra cultivation, and manuring, 200 pounds of lint have been raised per acre, though the average will not be over 120 pounds. The shortness of the season and the necessity of irrigation are difficulties that cannot be easily overcome in cotton culture, which has almost entirely ceased in this locality.

OATS.

The condition of the oats crop is from 1 to 6 per cent. above average n all the New England and Middle States, except New Jersey and Delaware; the former being 14 per cent. and the latter 20 per cent. below average. This shows a general improvement during the month of June in all the States except New Jersey, where the condition is 4 per cent. below that of the last report. In North Carolina the crop is 3 per cent. above average, showing an improvement of 13 per cent. during June. The other Atlantic States, and all the Gulf States, except Texas, are below average, though showing a general improvement since the last report. Texas is 10 per cent., Tennessee 3 per cent., and Kentucky 4 per cent. above average. West Virginia is 5 per cent. below, an improvement of 9 per cent. during June. Ohio and Indiana are below average, and have declined during the past month. The other States north of the Ohio River and west of the Mississippi are all above average. On the Pacific coast California is 13 per cent. above average, an improvement of 15 per cent. during the previous month. Oregon is 10 per cent. below average, a decline of 7 per cent. during June.

NEW YORK.—*Sullivan:* Never better. *Chenango:* Growing very rapidly. *Wyoming:* Fair for an average crop. *Steuben:* Very promising. *Livingston:* Very fine. *Erie:* Growing rank, and tending to fall before filling. *Onondaga:* Rank and thrifty.

NEW JERSEY.—*Sussex:* Injured by drought, but improving since late rains. *Mercer:* Very short.

PENNSYLVANIA.—*Franklin:* Crop benefited by rain. *Lancaster:* Short for the season, but with favorable conditions may yield a full crop; Birlie oats poor; White Schonen look well. *Berks:* Average. *Chester:* Shortened by drought. *Indiana:* Fine; promise over an average crop. *Elk:* Splendid. *Centre:* Promise an abundant yield. *Northumberland:* Promising. *Armstrong:* Rather rank; tend to lie down on rich, low land. *York:* Short; heads large and well filled; Birlie oats promise to be a success; over 3 feet high, large heads, and well filled.

MARYLAND.—*Montgomery:* Recent rains will make a good crop.

VIRGINIA.—*Albemarle:* Nearly nothing. *Clarke:* Improved by late rains; will probable make 40 per cent. of an average. *Washington:* Crop small. *Prince William:* Nearly nothing. *Henrico:* Spring oats not worth cutting; winter oats better, but not good. *Prince Edward:* Seriously injured by dry and cool May and June. *Prince George:* Spring oats almost a failure; winter oats well headed but short-strawed. *Surrey:* Injured by drought. *Highland:* Backward, but improving with late rains. *Rockingham:* Retarded by hot, dry weather; light, and heading low; Schonen better than any others. *Fairfax:* Not half the oats sown will be harvested. *Amelia:* Shortened by drought. *Orange:* A failure, but good rains would improve the crop. *Fluvana:* Shortened by drought. *King George:* Very low, but improved by late rains. *Culpeper:* Late rains have brought the crop to a half average; acreage decreased. *Charlotte:* Suffered much, and are very low; benefited by late rains. *Spottsylvania:* Oats redeemed from failure by soaking rains in the last ten days. *New Kent:* Suffered for rain. *Middlesex:* Spring oats not worth cutting; winter oats very fine. *Madison:* Almost an entire failure. *Augusta:* Failure. *Fauquier:* Failure.

NORTH CAROLINA.—*Forsyth:* Good crops. *Bertie:* Promise a fine yield. *Alexander:* Excelsior oats very fine looking. *Henderson:* Much improved, but will not make over three-fourths of a crop; Excelsior oats also deficient. *Mecklenburg:* Very good; winter oats the best. *Bladen:* Yield good. *McDowell:* Quite short, but well headed. *Ashe:* Excelsior looks well. *Hereford:* Crop will be heavy. *Davie:* Never better. *Alamance:* Thin in spots, but tall and well headed. *Rockingham:* Crop five times last year's. *Moore:* Very good. *Craven:* Best crop for many years.

SOUTH CAROLINA.—*York:* Poor, especially late sown. *Anderson:* Average, except upland spring oats, which drought renders not worth cutting. *Chesterfield:* Fall oats good; spring crop a failure.

GEORGIA.—*Muscogee:* Crop injured by rust and dry weather. *Chattooga:* Seasonable rains have improved the crop. *Catoosa:* Schonen oats doing admirably. *Sumpter:* More attention now paid to oats. *Gordon:* Grain extra fine; crop thin. *Wilkes:* Early fall sowings fine: spring sowings very poor. *Murray:* Drought severe on oats. *Walton:* Promising. *Gwinnett:* Average. *Oglethorpe:* Fall sown oats good; spring sown a failure. *Fannin:* Excelsior and Schonen oats doing well. *Cobb:* Better than last year.

FLORIDA.—*Bradford:* Shortened 25 per cent. *Columbia:* Yield lightened by drought. *Clay:* Increased cultivation.

ALABAMA.—*Conecuh:* Half crop. *Colbert:* Shortened by drought. *Butler:* Materially injured by drought. *Russell:* Above average 15 per cent.; spring oats uncertain; the fall crop better.

MISSISSIPPI.—Red oats, a good crop. *Talabusha:* Yield 25 per cent. above last year; heads good; straw medium. *Winston:* Excelsior oats; tall, and will do well if the rust does not take them; two weeks later than the common red oats. *Noxubee:* Nearly a failure from drought.

LOUISIANA.—*Red River:* Rust. *Claiborne:* More oats raised than of any other small grain.

TEXAS.—*Fannin:* Promising; Anti-rust oats the favorite; ripens early; yields 50 to 75 bushels per acre. Norway and other varieties grow too high and ripen too late. *Fort Bend:* Burnt badly. *Red River:* All oats rusted except White Schonen, which are fine. *Kendall:* Will average 30 bushels per acre. *Williamson:* Crop splendid; red oats thresh from 60 to 75 bushels per acre. *Fayette:* A variety of white oats, name unknown, yielded well without rust. *Harris:* None but experimental crops. *Hamilton:* Drought rendered a promising oat crop not worth cradling.

ARKANSAS.—*Crittenden:* Shortened by drought. *Madison:* Reduced 15 per cent. by rust.

TENNESSEE.—Crop good. *Coffee:* Injured by drought. *Madison:* Straw short; heads light. *Jackson:* Look fine; at least 40 per cent. over last year. *Robertson:* Late oats suffered by drought; late rains have greatly helped the crop. *Stewart:* Short strawed, but well grained. *Sevier:* Suffered by drought. *Polk:* Schonen oats have done well for a dry season. *Roane:* Promising. *Rutherford:* Good; straw short; heads fine; average reduced 24 per cent. *Hickman:* Unusually fine. *Sullivan:* Better than for several years.

WEST VIRGINIA.—*Braxton:* Crop generally poor; some will be too short to gather. *Harrison:* Cut short by drought. *Cabell:* Promises well. *Fayette:* The crop bids fair to be a fine one. *Kanawha:* Has improved wonderfully. *Monongalia:* Very promising. *Monroe:* Not much raised now, but the crop looks well.

KENTUCKY.—*Clarke:* Suffering for ten days past from dry weather. *Hardin:* Medium. *Fayette:* Fine. *Lincoln:* Have suffered for want of rain. *Pulaski:* Injured somewhat by storms. *Mercer:* Schonen oats fine, tall, and well headed; promising to be extra good. Excelsior not so good. *Hopkins:* Excellent crop. *Anderson:* Condition good. *Hart:* Short, but well filled. *Russell:* Threatened with rust in some places, but generally look well, promising a heavy yield. *Nelson:* Fine crop. *Henry:* Very heavy.

OHIO.—*Miami:* Suffering for want of rain. *Ottawa:* Suffering from drought. *Union:* Damaged by drought; some fields heading out six inches from the ground. *Coshocton:* Drought will reduce the yield 25 per cent. *Scioto:* Unusually good. *Auglaize:* Want of rain will reduce the crop below an average. The cut-worms have also destroyed some fields. *Morrow:* Early sown especially promises a large yield. *Delaware:* Dry weather in June has damaged the crop considerably. *Huron:* Will be a very light crop.

MICHIGAN.—*Wayne:* Never looked better. *Livingston:* Need rain. *Washtenaw:* Splendid. *Gratiot:* Late oats suffering for rain.

INDIANA.—*Randolph:* Late sown oats ruined by drought. *Morgan:* Never better. *Pike:* Very fine. *Kosciusko:* Drought and hail ruined the crop in some places. *Noble:* Shortened by dry weather. *Greene:* Never better. *Clarke:* The finest crop I have ever seen in the county. *Brown:* Splendid crop. *Owen:* Fine seeding season; splendid crop. *Cass:* Late oats somewhat improved by recent showers, but that which was sown early is too far advanced. *Stark:* Much injured by drought. *Bartholomew:* The finest prospects ever known. *White:* Suffering for rain.

ILLINOIS.—*Lawrence:* Very fine. *Will:* Increase in acreage. *Mason:* Very heavy, and lodged to considerable extent. *Bureau:* Crop will be large if not injured by lodging. *Ogle:* Indications are that the crop will be above average. *Clark:* Finest crop ever raised; if not prostrated by storms the yield will be nearly twice an average. *Mercer:* Rank and lodging. *Livingston:* Much beaten down by storms. *Pope:* Promising; expect that the drought of the past three weeks may make the grain light. *Montgomery:* The largest crop for many years. *Effingham:* Never better. *Lee:* Fine yield if they do not lodge too much. *McDonough:* Unusually good prospect. *Franklin:* The heaviest crop ever grown in the county.

WISCONSIN.—*Fond du Lac:* Heading out at 6 inches in height in some places, owing to drought. *Saint Croix:* Uncommonly good. *Green:* Look finely. *Lafayette:* Good prospect. *Calumet:* Damaged by the dry weather in June. *Dunn:* Favorable season.

MINNESOTA.—*Freeborn:* Acreage much increased by the sowing of much land which could not be planted in corn, owing to wet weather. *Murray:* Never looked better. *Steele:* Very fine. *Meeker:* Condition good, though slightly lodged. *Houston:* Look very fine.

IOWA.—*Chickasaw:* Never better. *Buchanan:* Heavy growth, and some fields badly lodged. *Muscatine:* Fully 10 per cent. above average. *Scott:* Condition above average. *Howard:* Doing well. *Marion:* Attacked by the chinch-bug. *Iowa:* Condition good. *Jasper:* Never better. *Hancock:* Never looked better.

MISSOURI.—*Saint Louis:* Never better, but badly lodged by a severe rain and hail-storm which passed over two-thirds of the county on the 25th of June. *Lincoln:* Never promised better. Some farmers count on 60 to 75 bushels per acre. *Platte:* Already injured by drought, which, if it continues much longer, will prevent a large proportion of it from growing tall enough to be saved. *Carter:* The Schonen oats is looking very fine in spite of the drought. *Caldwell:* Splendid crop. *Carroll:* Never before so good. *McDonald:* The oats sent from the Department promise well. *Lewis:* Better than ever before, although some fields where corn was grown last year have been taken by the chinch-bug. The greatest danger is from lodging. *Marion:* Double the usual acreage, and promise well. *Montgomery:* Injured in some localities by the chinch-bug. *Livingston:* Splendid condition. *Reynolds:* Look finely. *Cass:* Condition only moderate. *Jasper:* Crop heavy. *DeKalb:* The yield will be good if it rains soon. *Sullivan:* Will be much damaged by the chinch if the drought continues.

KANSAS.—*Brown:* Acreage greater than usual, owing to winter-wheat land having been replowed and sown in oats, which promise a heavy crop. *Rice:* Look well, though slightly injured in places by the grasshopper. *Cowley:* Good. *Osage:* Generally very fine. *Coffey:* An unusually fine crop promised.

NEBRASKA.—*Cuming:* Heavy. *Dakota:* Fine prospect, but danger of lodging from wet weather.

OREGON.—*Marion:* Look well, but must have rain soon.

THE TERRITORIES.—*Santa Fé, New Mexico:* Very promising. *Lewis and Clarke, Montana:* Very fine.

RYE.

In all the New England and Middle States rye is above average in condition, but with a reduction of 1 to 15 per cent. in acreage, New Hampshire and Vermont being the only States in which the area of last year was sown. In North Carolina the acreage is increased 4 per cent., and the condition of the crop improved 8 per cent. In all the other Atlantic coast States the acreage shows a decline. The Gulf States report an increased acreage, with an improved condition in Texas, and a decline of 5 per cent. in Louisiana. In Arkansas, Tennessee, and Kentucky the acreage is increased from 4 to 12 per cent. Ohio reports 11 per cent. decrease in area and 7 per cent. in condition; Michigan 3 per cent. in each. Indiana reduces her area 3 per cent., but her crop is over average in condition. The other Northwestern States are average or above in condition, and also in acreage, except Missouri and Kansas, which are 12 per cent. short. Five counties in Oregon show a general increase of 2 per cent. in acreage.

RHODE ISLAND.—*Kent:* Rye greatly improved by the late warm wet weather; straw light, but the grain nearly average; spring rye very promising.

NEW YORK.—*Jefferson:* Winter rye fair. *Dutchess:* Poorly filled, but well strawed. *Queens:* Fair.

NEW JERSEY.—*Morris:* Improved by late heavy rains.

PENNSYLVANIA.—*Luzerne:* Rye that escaped winter-killing is now 10 per cent. average. *Indiana:* Improved by late rains; from fair to good. *Northumberland:* Rye double what was expected early in the spring; about half average. *Butler:* Half average. *Montgomery:* Half a crop; shortened by drought.

VIRGINIA.—*Highland:* Very poor; acreage small; poor for several years.

NORTH CAROLINA.—*Henderson:* Reduced acreage, but enhanced yield. *Bladen:* Good yield.

GEORGIA.—*Gordon:* Grain extra; crop thin. *Marion:* Acclimated rye very good.

FLORIDA.—*Bradford:* Shortened 25 per cent. by drought.

TEXAS.—*Williamson:* Crop splendid. *Medina:* Drought has reduced the crop below average.

TENNESSEE.—*Dyer:* Scotland very fine. *Roane:* Scotch rye very excellent.

KENTUCKY.—*Lincoln:* Very good. *Mercer:* Promises very well; heads long and well filled. *Spencer:* Yield 10 per cent. greater, and quality equal to last year. *Anderson:* Good. *Henry:* Crop above average.

OHIO.—*Scotio:* Remarkably good.

ILLINOIS.—*Bureau:* Was thought to be winter-killed, but has come out well. *Ogle:* More than average.

MINNESOTA.—*Sibley:* Looks well.

IOWA.—*Calhoun:* Three or four acres sown; the first crop of the county; looks well. *Jasper:* Never better.

MISSOURI.—*St. Louis:* Yield short, but quality better than usual. *Carter:* The Scotch rye from the Department is a failure—will not make the seed. *Macon:* Fall rye winter-killed. *Reynolds:* The Scotch rye from the Department badly damaged by the Hessian fly. *Cole:* Average.

NEBRASKA.—*Hall:* Spring rye from Germany, introduced this season, promises well.

CALIFORNIA.—*Contra Costa:* Only raised by a few for German bakers; it grows luxuriantly. *Lake:* Nearly a failure.

BARLEY.

This crop is a full average, or above, in condition, in all the New England States, with a slightly diminished acreage. In New York and Pennsylvania it is about average, with a very considerable reduction of area. In several counties of New York the prospects of the crop are spoken of in enthusiastic terms. From some counties of Pennsylvania reports of injuries by drought have been received. In Maryland the acreage was reduced 35 per cent. New Jersey, Delaware, Virginia, South Carolina, and Florida make no returns of this crop, while in Georgia and the Gulf States it is mentioned only in one or two counties. Texas reports an increase of 14 per cent. in acreage. In Red River and Williamson Counties the condition of the crop is very superior. In Arkansas, Tennessee, and West Virginia it is cultivated to but a limited extent. In Kentucky it is more general. North of the Ohio River it is quite a common crop, but exhibits this season a considerable reduction of area in all the States except Wisconsin, where there is an increase of 4 per cent. In Ohio and Indiana the condition of the crop is below average; but in all the other States it is above. West of the Mississippi the condition varies from average to 18 per cent. above, with a considerable reduction of area in Missouri. On the Pacific coast the condition is from 5 to 12 per cent. below average.

NEW YORK.—*Wyoming:* Barley never looked better for a full crop. *Steuben:* Very promising. *Livingston:* Looking very fine.

PENNSYLVANIA.—*Lancaster:* Short, but looks well. *Chester:* Shortened by drought.

TEXAS.—*Red River:* Fine. *Williamson:* Splendid.

OHIO.—*Miami:* Turning out better than was expected. *Scioto:* Unusually good.

INDIANA.—*Posey:* Injured by the army worm.

ILLINOIS.—*Ogle:* Promises a fine crop. *Lee:* The only fear is from lodging. *Monroe:* Winter-killed.

WISCONSIN.—*Greene:* Spring barley looking finely, but much complaint of chinch-bugs. *Lafayette:* Good. *Calumet:* Has not suffered from drought like wheat and oats. *Dane:* Good season.

MINNESOTA.—*Freeborn:* Much corn-land seeded to oats and barley, owing to wet weather in corn-planting season. *Murray:* Never looked more promising. *Steele:* Splendid. *Meeker:* Somewhat lodged, but looks finely. *Houston:* Never better.

IOWA.—*Muscatine:* Fully 10 per cent. above average condition. *Scott:* Looks fine. *Howard:* Good condition; lodging in places. *Marion:* Attacked by the chinch. *Marshall:* Ten per cent. of my barley is blighted, but no complaint heard from others. *Plymouth:* A failure; frozen out. *Jasper:* Never better. *Mitchell:* Seldom has promised better.

MISSOURI.—*Saint Louis:* Winter barley 30 per cent. short of last year in amount, but of better quality than usual. *Nodaway:* Will be harvested the second week in July.

KANSAS.—*Brown:* Increased acreage and splendid promise.

NEBRASKA.—*Dakota:* Good prospect. *Nemaha:* Spring barley looks well.

CALIFORNIA.—*Placer:* Both yield and quality below average. *Lake:* Nearly a failure. *Amador:* Crop average.

POTATOES.

In the New England States the acreage in potatoes is very nearly average, and the condition above average, except in Rhode Island, in which it is 4 per cent. below. The Middle States are about average both in acreage and condition. The earlier planted appear to best advantage. The potato-beetle is reported in ten counties in Pennsylvania. In the other Atlantic and in the Gulf States as a whole, both acreage and condition are somewhat below average. In Louisiana and Texas both are above average, and all the other States of the Union the acreage is above average, except Wisconsin, which is 1 per cent. below. In condition West Virginia is 3 per cent., Ohio 7 per cent., California 2 per cent., and Oregon 7 per cent. below average. All the other States not mentioned are above average, the excess ranging from 2 to 9 per cent.

SWEET POTATOES.—No reports from New England, New York, Michigan, Wisconsin, and the Pacific States. The acreage of the other States is not far from average, ranging from 15 per cent. below in Florida to 15 per cent. above average in Nebraska. The general condition is considerably below average.

MAINE.—*Sagadahoc:* Large portions of the potatoes late planted on account of wet, but they are now growing very finely.

VERMONT.—*Franklin:* Rotted somewhat by heavy rains just after seeding.

NEW YORK.—*Wyoming:* Very promising. *Queens:* Look well.

NEW JERSEY.—*Mercer:* Look well; crops average; sweet potatoes affected by drought.

PENNSYLVANIA.—*Bucks:* An unusually large area planted in potatoes. *Berks:* Average. *Fayette:* Potato-bug appeared, but has done but little damage. *Chester:* Early planted potatoes doing well; late planted shortened by drought. *Northumberland:* Promising. *York:* Growing well and looking strong and healthy.

MARYLAND.—*Baltimore:* Promising a heavy yield; acreage large.

VIRGINIA.—*Albemarle:* Mostly eaten by bugs. *Clarke:* Destroyed by a lead-colored bug. *Prince William:* Prospect poor. *Princess Anne:* Potato crop full, but not all dug on account of low prices; the finest Early Rose commanded only 75 cents or $1 per barrel in Norfolk. *Henrico:* Early potatoes a failure. *Highland:* Promise of good crop.

NORTH CAROLINA.—*Hereford:* Very promising. *Perquimans:* Potato-bugs at work.

FLORIDA.—*Columbia:* Sweet potatoes injured by drought. *Clay:* Increased attention to the crop. *Orange:* Drought limited the planting.

ALABAMA.—*Conecuh:* Irish potatoes average; sweet potatoes delayed in planting and looking badly. *Montgomery:* Sweet potatoes promising. *Pike:* Potatoes a failure, vines luxuriant but no tubers. *Clarke:* Sweet potatoes injured by drought.

LOUISIANA.—*East Baton Rouge:* Crop fine; 25 per cent. greater than last year. *Rapides:* Sweet potatoes backward.

TEXAS.—*Hardin:* Promise a heavy yield. *Cherokee:* Fine crop. *Williamson:* Abundant and excellent. *Fayette:* Yield far above average, but in many cases are rotting from having been too early dug. *Gillespie:* Second crop planted. *Upshur:* Sweet potatoes as good as last year, and earlier planted.

WEST VIRGINIA.—*Pleasants:* Much infested with a worm that feeds upon the leaf. *Kanawha:* Flourishing.

KENTUCKY.—*Fayette:* Promising. *Hopkins:* Early potatoes very fine. *Spencer:* As yet uninjured by the bug. *Anderson:* Considerably above average.

OHIO.—*Miami:* Suffering from drought. *Hardin:* Drought for a month past; years ago when the clearings were small and timber plenty, June freshets were common, but seldom come now. *Medina:* Look well, but it requires constant care to keep the Colorado bug in check. *Greene:* Not nearly so much injury from the Colorado bug as was anticipated. Late potatoes may be injured to some extent, but early ones have escaped. *Ottawa:* Suffering from drought. *Union:* Small from the effects of drought. *Morrow:* Generally look well, but required faithful efforts to exterminate the Colorado bug. *Delaware:* In good condition; the bug has appeared, but done no damage as yet. *Lorain:* Suffering from the inroads of the Colorado bug, especially the "Early Rose." *Huron:* Look very well, though the bugs are troublesome in some parts of the county. *Athens:* Colorado bug and drought very hard on the crop. *Columbiana:* A loss of one-third of the crop by bugs indicated.

MICHIGAN.—*Wayne:* What few were planted look well in spite of the bug; condi-

tion reduced 10 per cent. below average by the Colorado bug. *Van Buren:* Much injured by the Colorado bug. *Shiawassee:* The bugs are damaging the crop greatly; Paris green used with good effect. *Emmett:* Scarcity of seed caused a reduction of the acreage. *Monroe:* The bugs will destroy 20 per cent. of the crop.

INDIANA.—*Floyd:* Very promising; several thousand barrels already shipped and the ground planted in cabbage. *Switzerland:* Largest crop of early potatoes ever grown; late ones now being planted. *Clarke:* Abundant promise. *Brown:* Doing finely, and not seriously injured by the Colorado bug. *La Grange:* Bugs very numerous, but more effort taken to destroy them, and the prospect much better than last year. *Marshall:* Crop somewhat damaged by the bugs. *Stark:* Drought has injured the early potatoes. *Bartholomew:* Promise an immense crop. *White:* Suffering greatly from drought.

ILLINOIS.—*Stephenson:* Growing rapidly, and it is hoped are out of danger from the Colorado bug. *Will:* With favorable weather the crop will be large. *Bureau:* Nearly double the acreage of any former crop, and looking well in spite of the bugs, which are numerous. *Ogle:* Acreage less than last year, but condition good; fewer bugs. *Clark:* Less damage by the Colorado bug than last year. *Pike:* An increase of acreage, but the drought has prevented a correspondingly large yield. *Pope:* Less than half the crop yet planted.

WISCONSIN.—*Douglas:* Sometimes planted at the head of Lake Superior as late as July 16th and do well. *Clark:* The crop promises over an average, in spite of the destruction by the Colorado bug. *Jackson:* Probably as good as last year. *Outagamie:* The potato-bugs more numerous than ever. Last year many potatoes were planted about June 20 and escaped them, producing better than early ones. The Early Rose and Goodrich are the only kinds which can safely be planted so late.

MINNESOTA.—*Sibley:* Condition good; no trouble yet with the bug. *Ramsey:* Never looked better; few bugs. *Steele:* The crop looks well, and it is hoped that the damage from the Colorado bug will be less than for some years past. *Meeker:* Some injury done by a black bug which has lately appeared. *Nicollet:* The bug disappearing.

IOWA.—*Howard:* Growing well, but still infested with the Colorado bug. *Iowa:* Damage in some places by the bug. *Mitchell:* Look well and not so much injured by the bug as usual. *Hancock:* Look fine, and not troubled by the bug. Early Rose potatoes large enough for table use two weeks ago.

MISSOURI.—*Polk:* Seed were very scarce, and many farmers planted as late as June 25. *Cass:* Those early planted small from lack of rain in June. Late potatoes look well. *Cole:* Not so much damage from the Colorado bug as last year. *Phelps:* Rather dry lately for early potatoes, which are being dug; some trouble also from the bug, but late potatoes have escaped them so far.

KANSAS.—*Leavenworth:* Will make a crop. *Rice:* Slight local damage by grasshoppers, but look fine generally. *Cowley:* Too dry for the crop. *Labette:* Fine crop of early kinds; late varieties slightly above average. *Lincoln:* Looked well up to June 25, but some complaint since of the bug. *Ceffey:* In fine condition. *Shawnee:* Good. Early Rose in market June 15.

NEBRASKA.—*Thayer:* The bugs have commenced upon them.

CALIFORNIA.—*Del Norte:* Entirely cut off by frost May 20. *Humboldt:* Looking well. *El Dorado:* The early varieties (especially the Early Rose) do well, ripening in six to nine weeks.

THE TERRITORIES.—*Morgan, Utah:* 25 per cent. destroyed by grasshoppers.

GRASS AND PASTURES.

Pasture.—The New England States, except Massachusetts and Rhode Island, report pastures above average, with a general improvement during June. New York is the only Middle State in which the condition is average. Pennsylvania and New Jersey have considerably improved during the month, but Delaware has greatly declined, reporting but 56 against 73 on the 1st of June. The South Atlantic States are all below average, and the Gulf States, except Florida, are above. Arkansas and Kentucky are above average; Tennesseeand West Virginia below. Ohio, Indiana, and Illinois are below average, and all the other Northwestern States, on both sides of the Mississippi, are above. California is above average and Oregon below.

Clover.—This crop is nearly average in the New England States, but considerably below in the Middle and Southern States, except in North Carolina, Mississippi, and Texas, which are above; Texas shows an excess of 23 per cent. In the remaining States the general condition

is somewhat below average, ranging from 88 in West Virginia to 112 in California.

Timothy.—The general condition of timothy is below average, except in the States immediately west of the Mississippi, which range from average to 7 per cent. above. The greatest decline is in Delaware, which is 47 per cent. below average.

MAINE.—*Franklin:* Heavy rains benefited the grass. *Penobscot:* Grass looks well. *York:* Heavy in some places; in others light. *Cumberland:* Weather fine for grass and pasture; prospect enhanced 30 per cent. since June 1. *Somerset:* Grass sown last spring has come up well; hay prospect good. *Waldo:* Grass, our principal crop, has done well this season; promises a fair crop. *Piscataquis:* Pasture looks well; grass grows finely.

NEW HAMPSHIRE.—*Rockingham:* Grass decidedly better than last year, except where winter-killed. *Hillsborough:* June very favorable to grass; hay crop would be large but for winter-killing. *Belknap:* Drought for two years has injured old hay fields; those just put down in grass look well. *Stafford:* Grass of all kinds developed wonderfully in two weeks.

VERMONT.—*Franklin:* Very fine; heavy crop of hay in most parts of the county. *Orange:* Unusual richness of pastures; heavy growth of timothy and clover. *Grand Isle:* Grass crop has become heavy since June 1. *Orleans:* Grass of rapid growth; with good weather the hay-crop will be larger than for ten years. *Caledonia:* Hay crop very heavy; heavier than for years.

MASSACHUSETTS.—*Franklin:* Grass crop has improved remarkably with wet weather; the injuries of winter are being repaired. *Worcester:* Hay, not one half a crop. *Bristol:* Grass crop has suffered from the drought. *Berkshire:* Decline of 50 per cent. of hay-crop; where meadows were top-dressed with manure last fall, the crop is good; the roots of the grass should be protected; even common earth is good; top-dressing on the increase. *Plymouth:* Early June showers gave great impulse to the hay while the dry weather succeeding was excellent for harvest.

CONNECTICUT.—*Litchfield:* Three fourths of a crop; about equal to last year; depreciated by two years' drought; continued rains may secure a fair crop; never was less grass on the 1st of July. *New London:* Canker worm in the meadows.

NEW YORK.—*Sullivan:* New grass seeding promises well. *Chenango:* Grass growing very fast. *Wyoming:* Grasses of all kinds have greatly improved. *Cattaraugus:* Hay prospect good. *Columbia:* Pastures very light. *Otsego:* Grass and pastures very fine. *Steuben:* Hay very promising. *Queens:* Hay light but harvested in good order. *Delaware:* Grass greatly forwarded by late favorable weather. *Lewis:* Pastures, clover and timothy better than last year; quality of hay not so good. *Erie:* June favorable to grass, but meadows are very spotted. *Onondaga:* Clover heavy; new laid timothy meadows very good.

CONNECTICUT.—*Litchfield:* Hay-crop equal to last year's, which was not over three-fourths of a crop; meadows injured by two years' drought; with continued rain, may give a fair crop; never was less on the ground on the 1st of July. *New London:* Canker worm at work in the meadows.

MARYLAND.—*Baltimore:* Hay crop light; clover barely worth cutting; timothy improving. *Frederick:* Pastures burnt up. *Cecil:* Pastures very bare; hay crop short. *Queen Anne:* Clover improved by late rains, which came too late for timothy.

MICHIGAN.—*Wayne:* Clover badly winter-killed.

NEW JERSEY.—*Sussex:* Clover injured by drought; later grasses in bottom meadows are looking better. *Mercer:* Clover used up by the drought; timothy short, but improved by two days' rain. *Morris:* All sorts of grass injured by the dry weather; on low-lands grass will be more than average, but in high lands it will be very short. *Monmouth:* Injured by drought. *Gloucester:* Grass crops injured by extreme drought.

PENNSYLVANIA.—*Cumberland:* Old meadows poor; new meadows fair. *Lancaster:* Grass short, but improving with fair weather; hay crop short, but good. *Luzerne:* Timothy shortened by drought. *Berks:* Hay crop 25 per cent. below average through drought; young spring clover burned out. *Bradford:* Crop improving, but old meadows will be light. *Snyder:* Grass greatly improved. *Chester:* Suffered from lack of rain. *Clearfield:* Grew rapidly in June. *Indiana:* Promising. *Elk:* Pastures never looked better; hay shortened by severe winter weather; some old meadows light from hard frost and long winter. *Centre:* Grass poor; clover next to nothing; young clover looks well. *Northumberland:* Better than was expected; three-fourths of a crop. *Butler:* Late rains have raised grass crops to a full average. *Beaver:* Hay crop short. *Wayne:* June rains favorable to hay. *York:* Early hay crop well cured and housed. *Montgomery:* Hay half crop; clover almost a failure; pasture very poor.

VIRGINIA.—*Albemarle:* Scarcely any hay saved. *Clarke:* Pasture and clover burnt up. *Washington:* Pasture a little better than last year; clover will not pay to cut; timothy very short. *Prince William:* Grass crop nearly nothing; pastures very poor.

Henrico: Grass crop a failure. *Frederick:* Grass and pastures improving. *Surrey:* Clover and pastures suffered from spring drought. *Highland:* Injured by cold late spring. *Fairfax:* Unprecedented failure of grass. *Amelia:* Shortened by drought. *Louisa:* Pastures dried up. *Orange:* Grass crop a failure. *Fluvanna:* Shortened by drought. *Pulaski:* Meadows light. *Spottsylvania:* Hay crop short. *Madison:* Grass crop short; hay less than for many years. *Fauquier:* Hay a failure.

North Carolina.—*Craven:* Wild grasses abundant and good; clover coming in favor; crop fine.

South Carolina.—*Newbury:* Clover abundant; culture encouraged.

Georgia.—*Murray:* Pastures dried up. *Whitefield:* Not rain enough for clover and timothy. *Macon:* Grass is dead in the pastures and, except on low lands, pastures are no better than in the dead of winter.

Alabama.—*Conecuh:* Pastures good.

Mississippi.—*Hancock:* No artificial pastures; natural perennial grasses not so abundant as formerly.

Texas.—*Dallas:* Experiments with timothy and clover unfavorable. *Bexar:* Prairie grass waist high. *Upshur:* Pastures better than last year. *Medina:* Drought has reduced pasture.

Arkansas.—*Washington:* Clover good; timothy average.

Tennessee.—*Rhea:* Grass has suffered from drought. *Smith:* Never had finer pastures nor finer prospects for a hay crop. *Sevier:* Clover suffered from drought. *Loudon:* Pastures and meadows suffering from cold dry spring weather. *Davidson:* Clover and timothy very light.

West Virginia.—*Raleigh:* Meadows and pastures injured by drought, but reviving under recent copious showers. *Marion:* Upland grass will be very light. *Braxton:* Meadows improving since recent rains, but the hay crop will be short. *Hardy:* Meadows and pastures shorter than we have ever seen. *Harrison:* Pastures and meadows very poor, but much improved by the late rain. Dry weather in April and May injured pastures and clover. Timothy and red-top meadow have improved rapidly since the recent wet weather set in, and pastures are now doing very well. *Lewis:* Condition of the hay crop much improved by recent rains. *Monongalia:* Not more than half a crop of hay. Fine weather now for pastures. *Monroe:* Grass of all kinds and pastures very fine.

Kentucky.—*Hardin:* Pastures rather short. *Fayette:* Grass of all kinds good *Lincoln:* Pastures well set and fine. *Carroll:* Fine season for pastures. *Clinton,* Meadows and pastures in good condition.

Ohio.—*Medina:* Clover harvest commenced; fair crop. Seasonable rains have kept grass and pastures growing. *Vinton:* The drought of last summer injured the stand of grass, and the dry spring following will reduce the hay crop more than one-half. *Coshocton:* Hay cut short about twenty-five per cent. by drought. *Pickaway:* Meadows and pastures injured by dry weather. *Morrow:* Clover and timothy good where not pastured, but scarcity of feed in early spring obliged many to graze their hay fields. *Delaware:* Hay considerably shortened by drought in June. *Lorain:* Pastures drying up. *Huron:* Pastures short. *Athens:* Pastures and meadows extremely light.

Michigan.—*Hillsdale:* Clover winter-killed and pastures light. *Lenawee:* Clover badly winter-killed, and pastures much shortened in consequence. *Washtenaw:* Grass light. *Calhoun:* Hay and pastures injured by the cold, dry weather of spring. *Mecosta:* Meadows and pastures much injured by a drought now prevailing. *Cass:* Hay fine, and being secured in fine condition. *Leelenaw:* If we do not have rain soon the hay will not be over half a crop. *Wayne:* Clover badly winter-killed.

Indiana.—*Madison:* Pastures very short, and meadows light. *Noble:* Hay and pasture cut short by drought. *Greene:* Too dry and cool in April for timothy and meadows. *Saint Joseph:* Clover and timothy the lightest yield for years, owing to lack of rain. *Cass:* Pastures somewhat improved by light showers recently. *Whitley:* Pasture badly dried up. *Wells:* Clover injured by cut-worms. *Marion:* Meadows damaged in some places by the army-worm. *Posey:* Grass injured by the army-worm. *Bartholomew:* Meadows never before so fine. *White:* Suffering greatly for rain.

Illinois.—*Lawrence:* Grass crop extra in spite of great destruction in some localities by the army-worm. *Bureau:* Clover much winter-killed; meadows fair; pastures unusually good. *Putnam:* Clover and timothy very much winter-killed. *Clark:* Clover was much injured by drought last fall, but the season has been unusually favorable, and a good crop will be made. Young clover especially fine. *Mercer:* Timothy promising. *Lee:* Hay short from winter-killing. Pastures light. *Winnebago:* Clover being harvested; yielding two tons per acre. *McDonough:* Meadows very fine.

Wisconsin.—*Waukesha:* Hay never better. *Pierce:* Much of the clover-hay has been damaged by rain in curing, and the farmers are much disappointed in their hay crop. *Richland:* Hay harvest will soon commence, with a prospect of a good crop. *Saint Croix:* Grass and pasture remarkably good. *Green:* Grass looking well. *Calumet:* Timothy and pastures in low condition, owing to drought this year, and close feeding last.

MINNESOTA.—*Ramsey:* Grass never looked better. *Wabashaw:* Clover and timothy very light, from winter-killing and drought last year. *Fillmore:* Grass of all kinds never better.

IOWA.—*Clinton:* The hay crop will be light, because we were obliged to pasture our meadows last fall. *Cedar:* Timothy and meadows injured by drought of last year and the cut-worm. *Muscatine:* Timothy almost a failure. *Scott:* Poor show for timothy. *Floyd:* Clover suffered severely by the winter, and timothy, notwithstanding favorable weather, does not make its usual growth. Tame pastures not up to average; wild ones above it. *Henry:* Timothy and meadows badly injured by worms. *Mahaska:* In many localities the timothy meadows have been ruined by a worm like the army-worm, which has now disappeared. *Jefferson:* The hay crop will be unusually light, owing to the depredations of the army-worm. *Madison:* Timothy much damaged by winter-killing and wire-worms. *Monona:* Little timothy grown, and that much injured by last year's drought.

MISSOURI.—*Barton:* Prairie-grass splendid. It is the only kind grown. *Lewis:* Old timothy meadows full of blue-grass; newly seeded ones looking very well. *Livingston:* Pasture and the grass in splendid condition. *Cass:* Pastures good. *Sullivan:* Old clover nearly all winter-killed; newly sown, excellent. *Phelps:* Old meadows light, but newly seeded clover and timothy have heavy growth.

CALIFORNIA.—*Tuolumne:* Hay injured by cold winds and rain in the spring. *Nevada:* Pastures dry. *El Dorado:* Clover and pastures good.

OREGON.—*Marion:* The hay-crop suffering for rain. *Lane:* Grass rather light. Meadows will not last more than three or four of our dry summers without reseeding. *Douglas:* What little hay there is, is mostly cut. *Clatsop:* Grasses generally good.

THE TERRITORIES.—*El Paso, Colorado:* Pastures splendid. *Lincoln, Dakota:* Grass looks well. *Lewis and Clarke, Montana:* Native pastures excellent.

TOBACCO.

MASSACHUSETTS.—*Hampshire:* Tobacco suffering severely from cut-worms.

CONNECTICUT.—*Middlesex:* Favorable condition. *Hartford:* Good weather, but the cut-worms destructive.

VIRGINIA.—*Mecklenburgh:* Looks very fine. *Nelson:* Poor stand through drought. *Cumberland.* Not over half a crop. *Prince Edward:* Bad stand; much replanted. *Prince George:* Drought injured tobacco. *Amelia:* Acreage reduced on account of drought. *Powhatan:* Bad stand. *Fluvanna:* Shortened by drought. *Madison:* Shortened by drought.

NORTH CAROLINA.—*Person:* Tobacco, the principal crop of the county, looks well; area increased; planting season propitious. *Davie:* Very fine; planted early and growing well. *Alamance:* Good.

GEORGIA.—*Murray:* Drought severe on tobacco.

LOUISIANA.—*Morehouse:* Very fine; crop annually increasing.

TENNESSEE.—*Smith:* Acreage increased 25 per cent. *Robertson:* Crop in good season. *Stewart:* A fair stand.

KENTUCKY.—*Hopkins:* Acreage large and planting in good time. *Ohio:* Acreage believed to be largely in excess of former years. Some complaint of bad stand, but condition generally good. *Russell:* Increase of 50 per cent. in acreage, and condition good.

OHIO.—*Medina:* Acreage last year 199 acres; less this year. *Vinton:* Considerable ground ready for tobacco, but the crop awaits rain.

WISCONSIN.—*Green:* Transplanting late, and precarious on account of dry weather.

MISSOURI.—*Livingston:* Looks finely. *Howard:* Preparations made for a very large crop, but the hot and dry weather prevented the setting out of a large portion of the crop before July 1; still, with a late fall, a heavy crop may be made.

HEMP AND FLAX.

VIRGINIA.—*Patrick:* Flax crop promising in northern part of the county.

KENTUCKY.—*Shelby:* Increase of 15 per cent. in the acreage of hemp—condition average. *Fayette:* Hemp very promising. *Jackson:* Increased acreage in flax, and an increase of 30 per cent. of lint and seed indicated.

OHIO.—*Miami:* Flax suffering for rain. *Morrow:* Flax is becoming quite a staple. Several thousand bushels of seed and several hundred tons of straw are produced annually. *Delaware:* Flax promises well.

INDIANA.—*Huntington:* Flax injured by cut-worms. *Randolph:* Late-sown flax burned up by drought. *Madison:* Flax badly cut by the worm. *Kosciusko:* Flax much injured by hail the latter part of May. *Wells:* Cut-worm bad.

MINNESOTA.—*Watonwan;* Hemp and flax sowed for the first time, and doing well.

Nicollet: Flax culture increasing in the southern part of the county. Dealers offer $12 per ton delivered, months ahead.

IOWA.—*Union:* An unusual amount of flax sown this season. *Johnson:* Flax is raised by the farmers for the seed, and the production of lint by steam mills is also rapidly increasing. Hemp is also profitable. *Marshall:* About 3,000 acres of flax sown, and it is reported in good condition. A large crop of flax growing; looks well.

MISSOURI.—*Platte:* The hemp crop very materially injured by the grub-worm. *Ralls:* Flax looks well, though the quantity grown is small.

NEBRASKA.—*Washington:* Flax is being introduced and promises well.

OREGON.—*Linn:* Great hopes were entertained of success in flax-growing, but the experience of the last two years is unfavorable. The present crop looks badly, and will probably not yield more than five bushels per acre.

SUGAR-CANE.

FLORIDA.—*Manatee:* Stubble cane injured during the winter. *Wakulla:* Crops good. *Alachua:* Good.

ALABAMA.—*Conecuh:* Small but doing well.

LOUISIANA.—*East Baton Rouge:* Cane crop short; considerably below last year. *Rapides:* Inferior; stubble crop a failure. *Saint Mary:* Seed-cane injured by the cold winter, hence but a small area was planted; stubble backward for the same reason. *Claiborne:* Sugar-cane has been largely superseded by cotton.

TEXAS.—*Fort Bend:* Looking well.

RICE.

SOUTH CAROLINA.—*Georgetown:* Seeded late, owing to protracted freshets; acreage about the same as last year; caterpillar ravaging the crops; the prospect not flattering.

GEORGIA.—*Glynn:* Backward; injured by rice caterpillar.

MISSISSIPPI.—*Smith:* Largely raised.

LOUISIANA.—*La Fourche:* Looks well; acreage average.

HOPS.

NEW YORK.—*Otsego:* Hops, the leading crop of the county, much injured by winter; growing crop looks well, but the yield will be reduced. *Oneida:* Very uneven; many hills destroyed by lice last year; lice have appeared this season, but have not done much damage.

WISCONSIN.—*Portage:* There are 100 acres of hops in the county, which are looking finely. *Richland:* The grub injured some yards badly, but they are clear of weeds, and generally look well. *Adams:* An increase in acreage and condition, as compared with last year.

FRUIT.

The prospects of the fruit-crop in different portions of the Union are quite encouraging.

Apples.—In New England the States are all above average, except Vermont, which is 5 per cent. below. The only case of insect ravages reported was in New London County, Connecticut, where the canker-worm was stripping the trees in some places. The highest condition, 117, is in New Hampshire.

Of the Middle States New York is 6 per cent. above average, but in some places the fruit is falling from the trees. In New Jersey the crop is 29 per cent. above average, the largest excess reported by any State in the Union. There seems as yet but slight drawback to the prospect of an abundant yield. In Gloucester County the yield will be unprecedented, if no disaster overtakes the crop. In Pennsylvania the crop is 5 per cent. above average, with some remarkable improvements in different quarters. In Lebanon County the prospect is better than for twenty years past. In Lancaster County the increase over last year will reach 50 per cent. In Bucks County all apples are doing well except "Smith's cider" apple, which is a partial failure. This variety is a spe-

cial favorite in this locality, where it is extensively cultivated. The fruit is generally excellent. Delaware reports a crop 20 per cent. above average.

In the South Atlantic and Gulf States the prospects of the apple-crop have not materially changed during the month of June. Maryland is 5 per cent. above average. In Southampton County, Virginia, the crop will be finer than last year, but not so large. Late frosts have cut down the crop in some counties. In Wise County the locusts have injured young apple orchards, depositing their eggs in the young branches. The State will reach an average crop if the conditions of growth continue favorable. North Carolina is 5 per cent. above average. Ravages of locusts are reported in two or three counties, especially in Haywood, where the blight also is destructive. In South Carolina the prospect is about the same as at the beginning of June, or 15 per cent. below average. Georgia is 12 per cent. below average, though the crop is reported fine, especially in Lumpkin County. Florida reports no apple-culture whatever, the climate being too tropical. In Alabama the crop is 4 per cent. below average; in Calhoun County the abundant bloom resulted in but a slender fruitage. In Mississippi the crop is 7 per cent., and in Louisiana 14 per cent. below average. In Texas it shows an improvement of 10 per cent. In Titus County the crop was injured by storms but the general drift of county reports indicates an increased yield and improved quality of fruit. The prospects of fruit-culture appear to be quite promising.

In Arkansas the crop is 2 per cent. above average. In Crittenden County injuries by caterpillars are reported. Tennessee reports quite favorably, the crop being 14 per cent. above average. No drawbacks from frosts or winds is reported. In West Virginia the crop is but 1 per cent. below average; in some counties it is very heavy. Kentucky is 6 per cent. above average, though in some counties blight and locusts have done some damage. In Metcalf County the crop is better than for many years.

Ohio reports 11 per cent. below average. The influence of cold weather and frosts was very injurious. The full bloom reported last month in Geauga County was blasted by cold northeast winds. In some counties the fruit is badly dropping off.

In Michigan apples are 1 per cent. above average. With favorable condition a fair crop will be realized. In Indiana the fruit is reported as falling off, through drought and other causes, reducing the crop prospects 8 per cent. below average. Noble County will raise but half the crop of last year. In Wells County the measuring-worm has injured the crop. Illinois is slightly above average—101. In Boone County the trees are injured by a small green worm. In McDonough County the bloom was in excess, but the fruit has dropped off very badly; apple bloom was also blighted in Monroe and McHenry Counties. Wisconsin reports a decline of 20 per cent. below average. A hail storm in Sheboygan County did very considerable damage to the crops.

In Minnesota the apple-culture, though young, presents quite promising results, the crops being 6 per cent. above average. In Ramsey County the trees are generally loaded. In Murray County a very large number of trees has been lately planted which have not yet come into bearing. Iowa is 6 per cent. above average. In Clinton and Allamakee heavy storms did great injury. In several counties frost caused the fruit to fall to a great extent. In Marshall County this year's planting will double the number of apple-trees. Missouri is full average, but

serious depredations are reported in different counties, which, however, are compensated by remarkably large crops of fine fruit in other counties. Kansas is 6 per cent. above average. Woodson County reports an improvement of 10 per cent. The apple-growers in all parts of the State appear to be in good spirits. In Nebraska the prospect is quite flattering, the apple crop being reported at 24 per cent. above average. In Beaver County, Utah, the apple-crop is almost a complete failure; it is supposed that this results from the detruction of the buds last year by the grasshoppers.

On the Pacific-coast the apple crop is short. California is 12 per cent. below average, though an abundant yield is reported in Contra Costa County. Late frosts are alleged as the cause of this depreciation of the crops in California, as also in Oregon.

Peaches.—From Maine and Vermont we have no reports of the peach-crop, which is cultivated in these States to but a limited extent. All the other New England States are above average except Massachusetts, which is 5 per cent. below, Rhode Island being 12 per cent. and Connecticut 8 per cent. above. New York is 6 per cent. and New Jersey 2 per cent. above average. Pennsylvania is 5 per cent. below. Peach-buds and even trees were winter-killed in several counties, especially Tioga, Fayette, and Elk. The superior crops in some localities are not sufficient to overcome the depreciation in others. In Delaware the crop is greatly shortened, being reported at but 50 per cent. of an average. In Maryland it is 28 per cent. short, though Baltimore County reports a good prospect of peaches, while in Washington they were never more promising. In Virginia the crop will fall 10 per cent. short of an average. In Spottsylvania County the peach is an almost total failure. In Wise the locusts have greatly injured young peach-orchards, depositing their eggs in the young and tender branches.

North Carolina is reported a full average, but the locusts' ravages are also here observable in several counties. In Madison County the young trees were largely killed. In Bladen and Onslow the fruit has extensively fallen from the trees; in Craven there is a complete failure. These deficiencies, however, are about compensated by the great abundance of the crop in other sections. In Edgecombe County the crop is the best on record, special attention having been paid to it. South Carolina is 5 per cent. and Georgia 12 per cent. below par. The Gulf States, except Texas, are all deficient, Florida being 23 per cent. below average. In some localities, however, the crop is quite promising. In Texas, while the general condition of the crop is 1 per cent. above average, in some counties the yield is especially abundant and fine. Peach-culture in this State is rapidly increasing. In Cherokee County some varieties ripened as early as June 1. In Hamilton the yield will be larger than ever before. In Titus and Medina the crop was injured materially by hail-storms.

In Arkansas the crop is 12 per cent. above average, though some local drawbacks are reported. In Crittenden County peaches were injured by late frosts. Tennessee is 14 per cent. above average, and the county reports generally very hopeful. An improvement in the quality of fruit is mentioned in several counties, no injuries from insects or weather being noted. In West Virginia the crop is 26 per cent. below average. In Raleigh County it is a total failure, except in the mountain slopes. In Nicholas and Monroe lowland peaches were generally frost-killed. Kentucky is 3 per cent. below average, yet in several localities superior crops are growing. The ravages of the locust are alleged

as the reason of the depreciation in other places. Hail-storms have also injured the crop to a limited extent.

In Ohio there will be, from present indications, but a half crop. Winter-killing of buds and trees is reported from Defiance, Franklin, and Huron Counties. In Butler, however, the trees are more uniformly loaded than in any former year. Michigan will fall 21 per cent. short of an average. Trees and buds were badly winter-killed in Washtenaw, Clinton, Lapeer, and Shiawassee Counties. From Wisconsin and Minnesota no reports of this crop have been received, the climate not being favorable to peach-culture upon a scale of any importance. Indiana is 3 per cent. below average. In Floyd County the crop is reported as "immense," but in other quarters the fruit has rotted and fallen off to a considerable extent. Illinois reports an improvement of 26 per cent. The peach has held its own better than any other fruit, in spite of insect and atmospheric injuries. Iowa is 13 per cent. in advance, though peach-blooms were considerably damaged by heavy storms in Clinton and Allamakee Counties. Missouri is 23 per cent., Kansas 31 per cent., and Nebraska 26 per cent. above average. The peach prospects west of the Mississippi are very fine generally. In California, however, there is a decline of 37 per cent., frost-killing being alleged as the cause of depreciation in many counties in California and Oregon.

Pears.—The prospect for pears is good in Middlesex County, Connecticut. In Tioga County, Pennsylvania, the bloom was quite full, but late frosts have greatly shortened the crops. The pears dropped off badly in McDonough County, Illinois.

Grapes.—The grape-crop of New England is from 4 to 29 per cent. below average. In Kent and Washington Counties, Rhode Island, and in Middlesex County, Connecticut, the vines were extensively winter-killed. In New York the crop is 21 per cent. below average. In Wyoming County grapes look well, but in Delaware they are too late to ripen. In New Jersey the crop is 12 per cent., and in Pennsylvania 5 per cent. below average. In Bucks, Bradford, Snyder, Mifflin, Tioga, Centre, Northumberland, and Lehigh Counties the vines were largely winter-killed, especially old vines. Some of these vines are again sprouting very promisingly. Delaware is 5 per cent., Maryland 10 per cent., and Virginia 5 per cent. above average. In several counties of the latter State the grape-crop is especially fine. North Carolina is 4 per cent. and South Carolina 5 per cent. above average. From different points in these States come reports of more abundant yield and finer quality of grapes, though in some instances a tendency to rot is noticed. In Georgia the crop is 2 per cent. and in Alabama 5 per cent. above average, while Florida falls short 2 per cent. In Montgomery County, Alabama, it is remarkable that all grapes are fine except the Scuppernong. Mississippi will reach 6 per cent. above average. In Hancock County the indigenous grapes, Scuppernongs, Muscatines, &c., are very abundant. Imported varieties, such as Catawba, Isabella, Concord, &c., invariably rot about the 1st of June. In Tishemingo County grapes were never so abundant. Louisiana is 2 per cent. in advance. In East Feliciana the Scuppernong grape is superseding all others, from the fact that it is not disturbed by birds. In Morehouse Parish the grape-crop is the best since 1868. Heavy rains in June caused some varieties to rot, but a free use of sulphur was found beneficial. The black Riessling is the only grape that never showed signs of rotting. In Texas the crop is 14 per cent. above average, and in a healthy condition generally. In Austin County the White German grape is very productive and promises to be a good raisin grape.

In Arkansas the crop is 6 per cent., and in Tennessee 9 per cent., above average. In Rutherford County, Tennessee, the Catawbas show some rot, but Ives's Seedling, Concord, Hartford Prolific, and Norton's Virginia are very promising. In West Virginia, are about an average, and in Kentucky 6 per cent. above. In Ohio, Indiana, and Illinois, the crop is about average, though complaints of winter-killing come from some quarters. In Michigan, Wisconsin, Iowa, and Minnesota, there is a decline from average condition of from 2 to 15 per cent. on account of the severity of the winter. West of the Mississippi the condition of the crop improves; Missouri being 7 per cent., Kansas 10 per cent., and Nebraska 8 per cent. above average. In Daviess County, Missouri, the Concord stood the winter better than the other varieties. In Neosho County, Kansas, the rose-bug was somewhat annoying. In California the crop is 4 per cent. below par, with, however, numerous marked exceptions. In Napa County last year raisins, equal to the best Malaga, were produced from the Muscat grape, and this year the product will be much increased. In Douglas County, Oregon, the grapes were injured by early frost, but subsequently started a new growth, and, if the fall season is favorable, will produce well. In Bernalillo, New Mexico, frost entirely cut off the grapes in some localities.

Strawberries.—In Maine, strawberries were 9 per cent., and in Vermont 4 per cent., above average; but in all the other New England States, and in all the Middle States, except Delaware, a decline is reported, ranging from 1 to 24 per cent. In Bristol County, Massachusetts, Wilson's and Cutter's varieties are the favorites for marketing. In Kent County, Rhode Island, strawberries are always a sure crop. In Delaware the crop is 16 per cent., and in Maryland 4 per cent. above average. Along the Atlantic coast the crop declines, Virginia being 8 per cent., North Carolina 5 per cent., and South Carolina 19 per cent. below average. Georgia is 2 per cent., and Florida 8 per cent. in advance. Alabama declines 5 per cent., while Mississippi rises to a full average, and Louisiana to 15 per cent. above. Texas is a full average, and Arkansas 18 per cent. above. Tennessee declines 4 per cent., and West Virginia 9 per cent. Kentucky is 13 per cent. above average. Ohio is 16 per cent., and Michigan 7 per cent. below, while Michigan, Indiana, and Illinois are about average. The drought was injurious in several quarters north of the Ohio. West of the Mississippi, Minnesota shows an advance of 34 per cent., and Nebraska of 26 per cent. above average, while Iowa and Kansas decline 13 per cent., and Missouri 29 per cent. In California the crop is 4 per cent. below average.

Table showing the condition of the crops, &c., on the 1st day of July, 1872.

States.	CORN.		WHEAT.		RYE.		OATS.	BARLEY.		PASTURE.	CLOVER.	TIMOTHY.	POTATOES, (Solanum tuberosum.)		POTATOES, (Batatus edulis, sweet.)	
	Acreage compared with last year.	Average condition July 1st.	Average condition of winter-wheat July 1st.	Average condition of spring-wheat July 1st.	Average condition of winter-rye, July 1st.	Average condition of spring-rye July 1st.	Average condition July 1st.	Average condition of winter-barley July 1st.	Average condition of spring-barley July 1st.	Average condition July 1st.	Average condition July 1st.	Average condition July 1st.	Acreage compared with last year.	Average condition July 1st.	Acreage compared with last year.	Average condition July 1st.
Maine	96	96	97	108	99	103	104	.....	102	110	94	98	98	104	.....	.....
New Hampshire	100	98	97	103	100	101	104	95	100	104	98	99	101	102	.....	.....
Vermont	98	101	90	104	103	102	106	.....	105	103	102	106	100	103	.....	.....
Massachusetts	96	98	98	101	96	100	101	100	99	97	92	95	96	100	.....	.....
Rhode Island	95	92	.....	.....	95	103	103	.....	100	93	103	93	95	96	.....	.....
Connecticut	94	98	94	100	95	.....	112	100	100	106	107	105	100	106	.....	.....
New York	99	95	78	99	93	103	106	86	104	103	97	97	101	102	.....	.....
New Jersey	102	96	69	.....	85	.....	86	.....	.....	73	59	67	96	96	91	94
Pennsylvania	102	98	69	96	86	101	100	89	97	87	82	86	103	102	98	95
Delaware	100	92	75	.....	87	.....	80	.....	.....	56	55	53	88	83	100	86
Maryland	100	92	57	.....	85	.....	72	65	.....	62	57	58	109	93	100	94
Virginia	100	94	99	.....	95	.....	74	.....	.....	78	72	69	98	90	101	89
North Carolina	98	101	112	.....	104	.....	103	96	.....	101	101	100	101	102	98	98
South Carolina	102	96	103	.....	100	.....	90	.....	.....	89	95	.....	93	81	96	82
Georgia	101	94	102	.....	99	.....	90	101	.....	95	97	97	95	83	95	82
Florida	100	78	.....	.....	93	.....	76	.....	.....	96	.....	.....	93	68	85	83
Alabama	103	110	116	.....	105	.....	94	113	.....	104	99	.....	98	93	100	98
Mississippi	101	110	108	.....	108	.....	98	.....	.....	106	108	.....	98	98	101	103
Louisiana	108	119	.....	.....	.....	.....	92	.....	.....	109	.....	.....	110	105	106	103
Texas	108	110	145	.....	113	.....	110	114	.....	108	123	.....	115	114	102	103
Arkansas	104	95	106	.....	112	.....	106	.....	.....	106	100	98	105	104	103	101
Tennessee	99	100	105	.....	110	.....	103	103	.....	96	93	90	102	106	101	100
West Virginia	102	95	95	.....	95	.....	95	91	.....	88	88	85	103	97	103	96
Kentucky	102	103	112	.....	104	.....	104	101	.....	105	102	96	104	107	101	102
Ohio	102	90	75	91	89	93	91	75	93	83	89	80	100	93	98	92
Michigan	110	96	81	98	97	97	106	96	104	96	89	96	106	109	.....	.....
Indiana	101	95	88	102	93	101	99	91	97	91	91	90	107	102	99	88
Illinois	102	99	92	104	100	100	110	93	103	106	97	100	114	109	100	99
Wisconsin	96	86	100	101	104	102	102	104	103	106	105	100	99	102	.....	.....
Minnesota	97	86	88	110	102	111	109	.....	108	110	91	103	124	110	.....	.....
Iowa	101	88	74	108	100	105	108	101	107	105	99	95	109	103	93	95
Missouri	104	97	66	78	88	100	113	86	99	106	102	107	101	102	95	97
Kansas	128	98	60	95	88	106	107	.....	108	105	104	103	117	109	114	95
Nebraska	120	97	71	112	100	105	111	.....	118	111	107	104	110	107	115	100
California	101	101	120	112	.....	.....	113	112	88	107	112	97	103	98	.....	.....
Oregon	100	97	94	95	102	.....	98	.....	97	95	97	92	107	93	.....	.....

Table showing the condition of the crops, &c.—Continued.

States.	BEANS.		SORGHUM.		SUGAR-CANE (not sorghum.)		TOBACCO.		COTTON.	WOOL.	APPLES.	PEACHES.	GRAPES.	STRAWBERRIES.
	Acreage compared with last year.	Average condition July 1st.	Acreage compared with last year.	Average condition July 1st.	Acreage compared with last year.	Average condition July 1st.	Acreage compared with last year.	Average condition July 1st.	Average condition July 1st.	Am't of wool *in hand* the compared with last year.	Average condition July 1st.	Average condition July 1st.	Average condition July 1st.	Product compared with last year.
Maine	103	101								79	108		93	109
New Hampshire	101	100								98	117	101	86	87
Vermont	105	102								108	95		96	104
Massachusetts	98	97					108	88		97	110	95	75	84
Rhode Island	100	101								100	110	112	83	88
Connecticut	99	102					117	101		101	115	108	71	76
New York	99	101								98	106	106	79	99
New Jersey	102	101								94	129	102	88	94
Pennsylvania	101	98	90	95			105	93		98	105	95	95	91
Delaware	105	90	50	70						95	120	50	105	116
Maryland	110	90	90	90			96	83		95	105	72	110	104
Virginia	97	88	75	95			99	90	96	99	100	90	105	92
North Carolina	100	100	84	97			108	102	94	98	105	104	104	95
South Carolina	98	90	94	94					97	97	85	95	105	84
Georgia	103	106	78	93	97	89	94	90	101	96	88	86	102	102
Florida					94	90			102	93		77	98	108
Alabama	114	113	80	100	102	99	105	92	106	99	96	91	105	95
Mississippi	100	101	87	105	102	100	96	95	109	92	93	85	106	100
Louisiana	99	100			91	93	100	100	103	123	86	81	102	115
Texas	104	104	103	109	113	104	104	103	105	105	110	101	114	100
Arkansas	103	95	96	99			125	103	95	116	102	112	106	118
Tennessee	99	102	88	95			106	98	104	95	114	114	109	96
West Virginia	101	96	88	88			103	98		89	99	74	100	91
Kentucky	102	104	89	98			116	105		101	106	97	106	113
Ohio	101	98	88	87			96	86		107	89	50	88	84
Michigan	103	101	79	93						104	101	79	85	102
Indiana	98	96	89	91			106	95		99	92	97	102	98
Illinois	99	100	91	96			105	102		100	101	126	99	83
Wisconsin	99	100					127	97		98	80		93	93
Minnesota	103	102	91	97						119	106		96	134
Iowa	100	100	94	93			105	94		102	106	113	98	87
Missouri	99	100	88	95			112	96	95	101	100	123	107	71
Kansas	112	102	104	97			107	99		108	106	131	110	89
Nebraska	104	105	97	98						130	124	126	108	126
California	91	94								111	88	63	96	96
Oregon	106	91								112	81	81	94	99

FOREIGN CORRESPONDENCE.

The Department has occasion to congratulate itself upon the continued advantages of its extensive foreign correspondence, and the successful results of the system of international agricultural exchanges which has been established with numerous governments of this continent and other quarters of the world. The Commissioner has had the satisfaction to receive from the director of the agricultural department of the Argentine Republic at Buenos Ayres the following interesting and highly encouraging communication:

ARGENTINE REPUBLIC,
Buenos Ayres, April 10, 1872.

SIR: I have the honor to state that, on the 1st of January of this year, the national agricultural department of this republic was duly installed, according to law, decreed by government on the 21st of July, 1871.

As it is of the highest importance to place itself upon intimate relations with similar institutions in other countries, and especially those which have arrived at such an advanced state in agricultural pursuits as that which I have now the honor to address; and as this country is as yet in its infancy, but abounding in agricultural wealth, which will be developed and in course of time occupy a prominent position among other countries of the world, I request the honor of mutual co-operation with the Department of Agriculture of the United States, begging that information may be sent to this department on all topics which concern the same, and which the prominent position of that institution renders of such vast importance, such as: First. New inventions of agricultural implements and machinery. Second. Discoveries with respect to the cultivation of agricultural plants, observations on growing the same, principally taking into consideration their peculiar nature and diseases. Third. Information as to the breeding of animals. Fourth. Cultivation of woods, gardening, fruit-trees, vegetables, flowers, &c., &c. Fifth. Mining, shooting, and fishing, (artificial fish-breeding,) or any other branch belonging to the agricultural department. This department will be most happy to afford in return every information concerning agriculture in this country.

The recently closed national exhibition in the city of Cordova has afforded this department an excellent opportunity to make collections of the agricultural products of this country, samples of which will be forwarded to foreign agricultural departments.

A remittance to this department of agricultural seeds, especially different varieties of wheat, barley, beans, oats, maze, cotton-seed, rice-seed, linseed, grass-seeds, &c., &c., forest plants, shrubs, and fruit-trees; also seed of same, (especially seed or plants of *Pinus gigantea*,) vegetable seed, models of agricultural implements and machinery, pictures of prize animals, pamphlets on agriculture, &c., &c., will be conferring a great favor, which will be highly esteemed by this department.

Trusting that the most friendly relations may henceforward exist between us to mutual advantage,

I remain, sir, yours, respectfully,

E. OLDENDORFF,
Director of the Agricultural Department.

The COMMISSIONER OF THE DEPARTMENT OF AGRICULTURE
OF THE UNITED STATES, *Washington.*

In connection with its foreign correspondence, the Department is in receipt of many publications from abroad, relating to agriculture and collateral subjects. From this source much interesting and valuable information is obtained in respect to the science and practice of husbandry in its various branches, as well as to the progress of agriculture in other countries. From the Agricultural Society of the Argentine Republic, accompanying a selection of valuable tree-seeds, including the seed of the *Nandubay*, (*Acacia cavania*,) a tree which is highly prized for building and other purposes, the wood being exceedingly strong, and of the *Espinillo*, another variety of the acacia family, bearing an odoriferous aromatic flower, the Department has received a series of numbers of the "Annals of the Argentine Rural Society." This publication, the organ of the society, is devoted to the collection of facts connected

with husbandry, and to the encouragement and general progress of agriculture in that republic. The subjects that are embraced in its statements and discussions afford gratifying evidence of a zealous interest in the development of the natural resources and agricultural capabilities of the country. These subjects embrace forest-culture; diseases of cereals; cultivation by steam; breeding of cattle; epizootic diseases; cultivation of the grape, the eucalyptus, rice, Indian corn, tobacco, &c.; wool, and the wool-trade; and a great variety of other topics. Among them is a curious article on the sunflower, a plant in the cultivation of which, for various economical purposes, an unusual interest has recently been excited in this country. Its culture in the Argentine Republic is strongly urged from the following considerations: The flowers are said to afford bees the best material for honey and wax; the petals are regarded as valuable for dyeing purposes; the seeds yield 50 per cent. of an excellent cooking and illuminating oil, superior food for poultry, and food for cows, which increases the production of milk; the bottom of the calyx resembles the artichoke, and can be used as food in the same way; the wood yields 1 per cent. of potash, while common hard wood yields only one-tenth as much; the leaves are used as food for animals, and make a good smoking tobacco; and the bark, properly prepared, affords material for the manufacture of paper.

A model farm is to be established by the agricultural department of the Argentine Republic, which is under the direction of M. Oldendorff, at Santa Catalina, about twelve miles from Buenos Ayres. The government has determined to expend half a million dollars in forming an academy, a farming school, and a gardening school, on the model of similar institutions in other countries. The studies to be pursued are, general farming, gardening, the care of horses and poultry, botany, growth of timber, chemistry, geology, land-surveying, machinery, drawing, and modern languages. The model farm will be conducted by students, from whom no pay for instruction will be required.

The department has also been favored by Señor Garcia, the minister of the Argentine Republic, resident at Washington, with a list of American exhibitors who obtained prizes at a late national exhibition at Cordova, the capital of one of the most important states of that republic. The list embraces the names of some twenty citizens of the United States, to whom gold and silver medals, as first and second prizes, were awarded, for improved implements of agriculture—plows, reapers, scythes, irrigators, corn-scatterers, hand-pumps, and other articles.

Under date of the 9th of May, General Charles P. Stone, recently of the United States, and now general and chief of staff of His Highness the Khédive of Egypt, writes that with the rapid increase of area of cultivable lands in that country, resulting from the wise improvements of the present Khédive, there is a lack of laborers for taking full advantage of the rich soil, and that hence the attention of land-owners is turned to the introduction of good practical labor-saving machines. The Department is solicited, therefore, to furnish sketches of such machines in agriculture as are simple and strong in their construction, and do not require too much skilled labor to manage and repair them. Hints upon cotton, rice, sugar, and tobacco culture, as practiced in this country, are said by General Stone to be seized upon with avidity by the cultivators of Egypt. The chemist of the agricultural department of Egypt has for a considerable period been engaged in testing various kinds of wheat, to ascertain which is most valuable in that climate. He finds that an Algerian wheat, after eight years of trial, has not deteriorated. General Stone suggests that this wheat would be valuable in the extreme

south of the United States, and proposes to forward to the Department a parcel of seed of the new crop, just being harvested. It is sown in December, and harvested in May, and stands very successfully the climate of Egypt, in latitude 30°, where it rarely receives rain, and is grown by irrigation. General Stone has sent to the Department a pamphlet on the Indian bamboo, which is being acclimatized in Egypt with great success. This pamphlet was recently published at Cairo, under the patronage of the Khédive, by the agricultural department of Egypt. We append a few notes from it, which may serve to answer inquiries frequently made at this Department for a suitable material for lining and protecting the banks of rivers and canals; for this purpose the bamboo, which may be acclimated in this country as well as in Egypt, seems to be peculiarly adapted :

The gigantic bamboo, which is of colossal dimensions, growing to the height of 20 meters, with a circumference of 40 to 50 centimeters at the base, (say 65 feet high and 15 to 18 inches in circumference,) from the joints of which, especially those of the middle and upper parts, grow numerous branches with long leaves, is the most vigorous species of this arborescent plant. It was introduced some years ago into the gardens of the Khédive of Egypt, at Ghézireh, from whence it has been multiplied in two or three other gardens of Egpyt. It was so much admired by the Emperor of Brazil, on his visit to the gardens of the Khédive last autumn, that he expressed his determination to import it into Brazil, and to cultivate it upon the imperial estates as a shade for animals during the heats of summer.

The gigantic bamboo originates in India and China, and is highly appreciated wherever it is cultivated, being used for posts in pavilions and the houses of the inhabitants. The hollow joints are utilized for carrying liquids, for flower-vases, &c.; and in China, and especially in India, for bottles and tobacco-boxes, highly wrought and polished, and sold at great prices. The larger stalks are also used for bridges, water-pipes, and carts and other vehicles. In fine, the wood is employed in the arts, in a multitude of industries, and for implements of agriculture.

This species of bamboo vegetates with such rapidity that it can almost be said that one can see it grow. Its progress may be seen from day to day, and at Ghézireh it has been known to grow 9 inches in a single night. In China, criminals condemned to death are subjected to the atrocious punishment of impalement, by means of the bamboo. A humid soil is congenial to the gigantic bamboo, although it suffers under a prolonged inundation. It is proposed in Egypt to cultivate it upon the borders of the canals in the vast domains of the Khédive.

There is also in the gardens of Egypt another species of bamboo, believed to be the *Bambusa arundinacea* of Wildenow. It presents the following characteristics: The stalks are smaller and shorter than the gigantic bamboo of India; it attains about 12 meters (39 feet) in height; it forms larger tufts or clusters than the great bamboo, and throws out a greater number of stalks, which are furnished with numerous slender and flexuous branches, bearing ordinarily tolerably large thorns, a little arched at the joints or articulations, and the leaves are smaller than those of the gigantic species, being rounded at the base, lance-shaped, tapering to a point, and a little downy.

There is another species of bamboo which it is proposed to cultivate in Egypt. It attains a height of 5 or 6 meters, produces enormous clusters of canes, about the size of the finger, and makes excellent props for use in horticulture. A plant of two or three years' growth will furnish a hundred stalks, forming a cluster of vast size. This species is the *Bambusa edulis*, so called from the fact that its young shoots are edible, and in China regarded as very nourishing.

There is still another species of bamboo to which the attention of the cultivators in Egypt is called. It is the black bamboo, (*Bambusa nigra.*) It is distinguished principally by its slender branches, which are of a fine black color, and from which canes are manufactured extensively for exportation. Pens are made from the smaller stems, which are commonly used for writing in Egypt.

The opening of direct communication by rail from New York to San Francisco, and by steamship thence to New South Wales, has so shortened distance that our buyers of Australian wools, instead of going to England for supplies, may go direct to the first market. This has induced the Agricultural Society of that colony to send to R. W. Forbes & Co., of New York, thirty-three prize fleeces, which were exhibited in the exhibition in Sydney in 1871, "in order,"

as stated by Mr. Joubert, secretary of the Agricultural Society of New South Wales, "to enable not only the buyers of wool, but also the breeders of sheep, to see what we produce; and with a view to bring about an exchange which must necessarily prove of mutual benefit." These fleeces were designed for the New York Chamber of Commerce, but as that body has no suitable room for their exhibition, they have been sent to this Department, where they may be examined at any time in connection with the descriptive catalogues which accompany them. The subject of a system of exchanges of wools and of breeds is thus proposed by Mr. Joubert:

The council desires me to say that they are most anxious to enter into regular communication with your Department, with a view of establishing an exchange of blood in sheep, cattle, &c., &c. I need not say that we shall place anything coming from you before our members, and obtain the greatest possible notoriety for your products * * * We hold a metropolitan exhibition once a year, and it has been our wish to obtain exhibits from the States; hitherto we have had but few, and principally implements.

As the Department has no means wherewith to establish a system of exchanges of animals, it can only refer the proposition to individuals and associations for their action. In this connection the following letter from Mr. Randall, president of the National Wool-Growers' Association, is worthy of consideration:

CORTLAND VILLAGE, NEW YORK,
March 25, 1872.

DEAR SIR: While I think it would be discourteous to decline a system of exchanges of domestic animals with the Agricultural Society of New South Wales, I confess I cannot, at present, see how it can be rendered successful. I am inclined to think our importers of choice horses and cattle and coarse-wool sheep would prefer to look for them in England, and it would not pay to import any but very choice animals from Australia. Owners of these would not be likely to wish to export them on uncertainties, and without knowing distinctly what they were to receive in return.

In regard to fine-wool sheep, apparently the most favorable subjects of exchange, the standards of breeding in the two countries are essentially different. A friend of mine brought out from Australia some merinos, six or eight, and placed them with me. They were from the most celebrated flocks, and were mostly first-prize sheep at the Australian International Colonial Show. They were of good size and form, and were very hardy and vigorous. Their wool was much finer than ours, and more than proportionably lighter. Compared with ours, they were a thin-wooled sheep. Their fleeces would not sell for enough more per pound than American merino fleeces to be as profitable as the latter.

Hundreds of American breeders of full-bloods saw them on my farm, and not one of them would have taken the sheep as a gift. I ceased to breed them separately, and not being willing to use the rams, they became extinct, with the exception of one prize ewe of the original importation, which I now have.

Our breeders, who grow finer sheep than the American merino, generally prefer certain German stocks, which give heavier fleeces than the Australian; and though their wool is not so fine as the latter, it is as fine as any demanded, to any extent, in our markets. The truth is, very fine merino wool never fetches enough more than that of medium fineness to make up for the difference in weight of fleece.

Mr. Joubert wrote you that the American merinos heretofore exported to Australia were not liked there. Their sheep proved equally unsatisfactory here. I cannot, therefore, see much, if any, prospect of a satisfactory or useful exchange.

I am, sir, very respectfully,

HENRY S. RANDALL.

Hon. FREDERICK WATTS,
Commissioner of Agriculture.

Among the recent foreign publications received at the Department is the "Bulletin of the Royal Society for the Protection of Animals in Belgium," which contains views worthy of attention and adoption. The protection of animals against the cruelties of human avarice has an economical as well as a moral importance, and may well claim the aid of

national legislation. The penal code of Belgium inflicts fines and imprisonment upon persons guilty of maltreating animals or of exposing them to torture in public spectacles and fights. The society above referred to is designed to promote the merciful treatment of animals; to co-operate with the laws which aim at that end; to encourage such publications as are calculated to further the object; and by all practicable methods to enforce the law which, in that respect, ought to rule in every man's heart. It aims likewise to check the needless cruelties which too often attend the slaughtering of animals, and even extends its beneficent guardianship to the protection of such birds as the interests of agriculture require should be preserved from the snare of the fowler. The bulletin furnishes information also as to the operations of other foreign societies for the protection of animals. At the International Exposition of Agriculture to be held at the Hague in September next, by the Agricultural Society of Holland, premiums, with a view to the more comfortable working and compassionate treatment of animals, are to be offered for the most approved railway car for the transportation of cattle; for the best descriptions of harnesses for plowing, for draught, for the tow-path upon canals, and for ordinary carriages; for improvements in head-stalls, bits, halters, sheep-shears, methods of transporting poultry, &c.; and also for treatises on horse-shoeing, slaughtering animals, and insectiverous birds. A society at Lyons has offered a premium of 200 francs for the best treatise on the origin and causes of cruelty to animals, and the most natural and effectual remedies. A society exists at Hamburg which is distinguished by its active and intelligent efforts. It numbers 1,250 members, and extends its operations to the giving of horse-blankets to hackmen and others who are unable to purchase them, and to the distribution of rewards among those who are especially careful of their horses, and premiums for meritorious acts of solicitude for animals, as well as to the detection and prosecution of cases of cruelty.

The colonial secretary of the island of Trinidad, in response to a letter of the Department, writes, that the government of that island will be happy to co-operate with the Department of Agriculture in Washington in effecting a mutual interchange of plants and seeds indigenous to the respective countries, and that the government botanist has been directed to prepare such seeds and plants as this Department may desire to possess.

TEA-CULTURE IN JAPAN.

The Department of Agriculture is indebted to the Secretary of the Navy for the following very interesting report upon the culture and preparation for the market of tea in the Suruga district, Japan, made by Master J. E. Pillsbury, in command of the United States steamship Emperor, and transmitted to the Navy Department by Rear-Admiral Jenkins, of the Asiatic fleet. The Emperor was detailed to convey Mr. C. O. Shepard, chargé d'affaires, and a party of several other gentlemen, including two Japanese officials, from Shimidze, Japan, to the tea district; and Master Pillsbury made the observations which are detailed in his report in company with this party, under the guidance of a merchant of Skidzaoka, from whom much valuable information was obtained.

UNITED STATES STEAMSHIP COLORADO,
Yokohama, Japan, May 17, 1872.

SIR: * * * * * * * *

The tea district of this province (Suruga) is about twenty miles nearly west from Shimidze. A tea merchant from Shidzaoka, (a city about ten miles from the bay,) who receives his tea from many plantations in the neighborhood, was our guide, and took great pains to give us all the information in his power. The tea of this province, which is said to be among the best of any in Japan, amounts yearly to twenty thousand piculs, nearly one-sixth of the whole production. The seeds are planted in December and grow during the first year two or three inches. On the third year, a light crop may be picked, which goes on increasing until the ninth or tenth year, when it is largest and has the best of flavor. The full life of the tree is from twenty to thirty years, and when it has reached this age it is cut down to the stump. Shoots spring up again, and in three or four years are ready for picking. This second life of the tree is much better than the first, both in flavor and size of production; but after it has run out they are obliged to dig it up and replant the seeds.

Nearly all the small farmers owning but little land raise grain enough for home use, and among the wheat, buckwheat, rice, &c., plant the tea-trees. The regular growers, however, have their plantations separate, and almost entirely on hill-sides, which are sometimes so steep that it would seem almost impossible to ascend. They are four or five acres in extent, the trees planted quite regularly, and four or five feet apart. The soil, which may be quite ordinary, is manured with fish, or bean-cake, but only sparingly.

When the tree is in its prime it looks like a very angular apple-tree reduced in height to four or five feet. Of all the branches of more than a year's growth but very few run in the same straight line more than a few inches, but turn in every possible direction in sharp angles. The probable cause of this angularity is the continued picking and twisting it has in its smaller and more tender branches as they pick its leaf. The leaf in its full size is about one inch and a half in length, with a very fine serrated edge, quite firm, and has a slightly waxy appearance. Its veins are very few and but slightly visible, except when looking toward a strong light. Until they are nearly the full size they are a very light green, turning as they become old a dark green, and quite stiff.

The picking-party, composed of women and older children, start to the field early in the morning, carrying several square bamboo baskets holding about two bushels, and smaller round ones to sling to the waist of each picker. They work systematically, up one row and down the next, one or two at each bush, picking with great rapidity the light-green leaves and as little of the stem as possible. As soon as the small basket is filled it is emptied into the larger ones, which are carried to the farm-house as fast as they are ready. There are two pickings during the year—the first about the 1st of May, and the last by the 1st of August. Sometimes there are intermediate ones when the demand is great, but it produces very inferior tea, as recourse must be had to the dark, stiff leaves. The first picking is always the best, and the earlier it is the better, for then the leaves are younger. The average crop of the regular pickings from one tree is 13 pounds per year.

At the farm-house the men remain to prepare the leaves. They first put about a bushel at a time into a shallow bamboo basket, over boiling water, and cover up, to steam. They remain here from 45 to 70 seconds, become very soft and pliable, and only require to have the superfluous water evaporated from them to be ready for the next process.

The next operation is to fire them. The firing-pans are made of a frame of wood about 54 by 36 by 4½ inches, with a very thick paper bottom. This tray is placed on a fire-place built of mud and lime, in which is a charcoal fire, having a temperature at the paper bottom of about 140°. On the top of the fire-place or oven is a grating of flat iron to keep the bottom of the tray from coming through. The green leaves are put in the tray to the depth of about two inches, and kept moving by the hands to prevent them from sticking together. As they begin to dry and change color to a dirty brown, the man takes his hands full and rolls them to assist in the curling. This is continued from 60 to 90 minutes, when the leaf is of a brown-black color, and rather dry. They are then taken out, allowed to cool, and all the imperfectly rolled ones and bare stems picked out. They are again put back into the firing-pans to finish drying and get an additional curl. It is now nearly black, and is ready to be packed in paper bags to be sent to the native tea-merchant. One man must prepare 10 catties, or 13½ pounds, per day to earn his wages; in doing this he expends 40 catties, or 50-odd pounds, of the green leaf, 75 per cent. being lost in firing.

After leaving the tea district we went to the city of Shidzaoka to visit the establishment of the merchant who had been our guide. There, after slightly warming the tea, as received from the country, in the same kind of pans, it is put through bamboo sieves, for the purpose of assorting the grades; the finer kinds only are marketable to foreigners, and the coarser leaves are put into inferior tea for native use. After sifting

they are put into firing-pans and kept in motion for about twenty minutes. It changes color to a greenish tinge and has a fine aromatic odor.

The last operation is to fan the dust out. About two or three pounds are placed in a bamboo vessel shaped like a coal-shovel, having a square edge on one side and high curved sides on the other three. The man who holds it tosses the tea up and at the same time forces the sides together, making the bottom quite concave. As the tea falls he extends the sides, thus allowing the bottom to spring back to its natural position, and making it act as a fan to produce a current of air under the tea. As all the dust falls, sinking below the large leaves, it is brought into contact with this air, and so blown out on the floor. It is then boxed up and sent to the European merchant.

The preparation of tea for use would not be complete without a description of the operation it goes through with in the hands of the foreign merchant. The tea, as received from the native merchant, after being weighed is thrown into a large bin, from which it is measured out to the firing-girls. Instead of the wood and paper trays they have iron bowls about two feet in diameter, encased in long masonry ovens, with a place for the charcoal fire under each one. The tea in them (over a heat of about 175°) is kept continually moving to insure equal heating. Experts move about while the firing is going on, and when it has reached the proper point, direct it to be removed. It is then a grayish-green color, perfectly dry, and has an improved flavor, but being very brittle, is considerably broken up. It is then sifted to exclude the dust, packed in leaded cases, covered with mats, and is ready to be shipped. The entire loss in weight, from the time the leaf is picked until it reaches the consumer, is about 80 per cent.; from which we see that the small province of Suruga alone produces yearly about 100,000 piculs, or over 13,000,000 pounds, of the green leaf.

INDUSTRIAL EXPOSITIONS.

UNIVERSAL EXHIBITION AT VIENNA, IN 1873.—An exhibition of unusual magnitude and importance is to be held at Vienna during the coming year, under the patronage of the Emperor of Austria. It is designed to afford a complete representation of the present state of civilization and the entire sphere of national economy. An act of Congress, passed at the last session, authorized the President to appoint one or more agents to represent the Government of the United States at this international exposition, provided that such appointments shall not impose on this Government any liability for the expense they may occasion. In accordance with this act the President has appointed Mr. THOMAS B. VAN BUREN to be commissioner on the part of our Government. Mr. Van Buren has an office at 51 Chambers street, New York, where exhibitors may obtain any desired information concerning the exposition. The exhibition will be held in the Imperial Praeter, a place admirably adapted to give it the best effect by affording the amplest facilities for the display of the contemplated vast collection of the arts and industries of universal civilization. The Praeter is an immense park, some five or six miles in length, traversed by six noble avenues of chestnut-trees, running in different directions, the principal one being 15,000 feet in length. It is divided into three parts, one for horsemen, one for pedestrians, and the other a broad road for carriages. Nothing of the kind in the world, perhaps, exceeds this grand promenade and drive. It is the customary place of resort for the citizens of Vienna on Sundays and holidays, and on ordinary occasions it presents the appearance of a great fair. It is characteristic of the gay and hospitable people of Vienna, and gives full scope to their proverbial love of harmless amusements.

Agriculture, horticulture, forestry, and industries of every description, including the arts of war as well as of peace, and the fine arts, will be embraced in the objects to be exhibited. An attempt will be

made to give an epitome of the history of inventions, by competitive trials of machinery, apparatus, and methods of work of different dates; in addition to which the productions of machines and hand-work will be placed side by side, to show that while in some cases machines have superseded hand-work, in others they have aided and increased its products. A representation of the commerce and trade of the world will be given by exhibiting specimens of the articles of trade at all the important sea-ports, each specimen being marked with the origin, destination, price, and quantity of import and export of the article. There is hardly anything, however remotely connected with agriculture and the industrial arts, that will not be embraced in the comprehensive programme of this universal exhibition; and the whole will be accompanied by international congresses and conferences for discussing important matters, and special lectures and experiments, such as will subject machinery and various scientific theories to practical tests. The exhibition will be diversified, and its staid character of utility relieved, by representations of all kinds of sports, including the inevitable race, regattas, and national games and plays; and exhibitors will have an opportunity to dispose of their alimentary substances in tasting-pavilions and refreshment-rooms erected for the purpose.

The exhibition includes some novelties or features which are not common to such occasions, and which, if carried out to their full extent, will be of valuable as well as of curious interest. Among these are plans for affording different nations an opportunity to illustrate their peculiar forms and actual conditions of domestic life, by presenting models of the inner arrangement, furniture, and decorations of their private dwelling-houses, and also the arrangements, furniture, and utensils of their farm-houses. The object is to show how the private dwelling-house can and ought to be built in order best to fulfill its purpose, taking into consideration the climate and local circumstances, and the mode of life, wants, and habits of different peoples. The practical value of such an exhibition will be, that it will furnish opportunities for instructive comparison of different styles of domestic architecture, and for recommending that which may be best suited to particular climates and habits of life—economy, taste, and comfort being taken equally into account. The farm-house exhibition is well calculated to attract the peasantry, and to arouse their special interest. The generally unsuitable condition of farm-houses constitutes a good objective reason for the proposed international display, with a view to such comparison as will excite attention and stimulate to improvement.

Agricultural Exposition at Barcelona, Spain.—An agricultural and industrial exhibition of implements of husbandry, with particular reference to those connected with the culture of the vine and the olive, and the fabrication of their products, is to be opened in September next at Barcelona, the capital of the principality of Catalonia, in Spain, commanding one of the most fertile and best cultivated plains in the Peninsula, and famous for the manufacture of wines and brandy. Competition will be free to all nations, and the Spanish government has arranged to admit models free of duty and at reduced rates of transportation. Implements and machines sent for exhibition will, if desired, be submitted to practical tests as to their capacity, efficiency, and economy of operation. Besides being rich in wines, Catalonia has extensive manufactories of cotton, silk, lace, and glass.

JAPANESE PAPER.

The manufacture of paper is one of the most remarkable of the native industries of Japan. An account, recently obtained through the British consuls at Kanagawa, Nagasaki, and Osaka, contains many interesting facts, both as to the extent to which the manufacture is carried and the raw material from which, in almost endless variety, the article is made. No nation in the world, perhaps, has displayed greater ingenuity, skill, and patient industry in adapting paper to so many useful as well as ornamental purposes. Inquiries submitted to the Department in respect to this manufacture have induced a brief statement of the facts of which it is in possession. These facts, by no means as full as could be desired, in an agricultural point of view, are not without value as indicating the practicability of cultivating, in the varied climate of our own country, those productions which have supplied the Japanese with such economical materials for the manufacture of paper.

The paper-mulberry, (*Makódzu*,) the Kaji tree or shrub, and the Makaso and other plants, are cultivated in Japan for the manufacture of paper. The paper-mulberry has been thus used for two hundred and fifty years. From a very ancient date, and up to the year A. D. 280, or thereabouts, silk, with a facing of linen, was used in Japan for writing upon, as were thin wood-shavings. In that year paper was imported from the Corea, and no other paper than that appears to have been known in Japan till about the year 600, when the manufacture was introduced by a priest from Corea, who had probably learned the art from the Chinese. A son of the then reigning Mikado learned of this priest how to make paper. That first made, of whatever material, lacked strength and durability, easily became worm-eaten, and did not take the ink well. The Mikado's son first used successfully in the manufacture the mulberry, which, hence, came to be called the paper-mulberry; he also caused it to be planted throughout the country, and the mode of making paper from it to be extensively promulgated.

The paper-mulberry is cut down to the root annually for four years; in the fifth year, it becomes a dense shrub from six to ten feet high, when the shoots, or stalks, are cut, steamed, the bark stripped off, dried, and prepared for making paper. This is done by washing and boiling the bark, and pounding it with clubs into the requisite pulpy state. The paper is set or formed in frames, or sieves of bamboo, by dexterous manipulation, somewhat after the old method in this country of making paper by hand, in sheets, the size of which was regulated by the frame or mold. The young wood is preferred for paper material, and the inner and whiter bark of the youngest branches is selected for the better qualities of paper.

The kaji tree, also used extensively for paper-making, is a shrub which grows in all parts of Japan, and is cultivated in the same manner as the mulberry. The plant is said to resemble our willow, and like that thrives well near water. There seems to be no reason why it and the paper-mulberry should not flourish in this country, and it is supposed that paper can be manufactured from the bark of either at a cheaper rate than from any equally good material which we now use. The paper-mulberry has indeed been cultivated in the grounds of the Department of Agriculture with the same success which has attended the introduction of the Chinese mulberry; so that the capabilities of the milder climates of our country for its growth may be considered as having been demonstrated.

The makaso and several other plants used for making paper are cultivated in the same manner, and manufactured by the same general process as the mulberry, the manipulations varying only with the classes and qualities of the paper produced. The kinds of paper that are made are almost innumerable, some of them possessing extraordinary qualities, and the purposes for which they are used are surprisingly various, embracing the most delicate as well as the roughest objects, and involving ingenious processes and great skill and dexterity in their manufacture. Paper is made in imitation of leather and of water-proof cloth, and possesses all their qualities. This is done by an admixture of a paste or glutinous substance which is produced by boiling fern and other roots, adding a juice expressed from unripe persimmons. It is dyed of different colors, and is a very tough and strong material, perfectly impervious to water, and capable of resisting intense heat. It is used for boxes, trays, and similar purposes, and even for saucepans, which sustain no injury over a hot charcoal fire. Prepared with oil, it is used for rain-coats, and as a substitute for glass in windows. Water-proof great coats, made of this species of paper, may be purchased for about 35 cents a piece, and they are completely impervious in a storm of rain, although very light. The Japanese persimmon, which seems to be an essential element of this description of paper, is in process of successful culture in the gardens of the Department of Agriculture. It does not differ in its constituents from that which is indigenous to the southern portions of this country; but it is much larger and altogether of a superior quality, and its successful culture in this country, which may be regarded as assured, is a matter therefore of commercial as well as agricultural importance.

The Japanese are wonderfully proficient in giving to paper great hardness and weight, as well as extreme delicacy, lightness, and beauty of texture. It is impossible to tear the tougher sorts of paper across the grain, and thin strips, torn in the opposite direction, make tough and convenient strings.

The inquiries in respect to Japanese paper which have been addressed to this Department have exclusive reference to its commercial aspect, and to the question of its importation. It is obvious, however, that the papers of Japan, various and beautiful and valuable as some of them are, could not be utilized in this country and made available as an article of merchandise for the reason that they are adapted only to the peculiar tastes and customs of the Japanese themselves. The consular reports referred to contain enumerations of various kinds of paper manufactured in Japan, known by distinctive names, and extending to a hundred and fifty different classes. Besides the uses previously specified, different sorts of paper are manufactured expressly for the making of hats, coats, shoes, bags, umbrellas, handkerchiefs, fans, screens, wall-decorations, candle-wicks, mats, toys, trays, boxes of all kinds, purses, pocket-books, tobacco-pouches, ornaments of every description, hair-strings and pins, female hair-ornaments, bank-notes, drawing, painting, and numerous other purposes, including diplomatic, ceremonial, and fanciful descriptions for official dispatches, letters of congratulation, and other communications exchanged on festive occasions.

The handkerchiefs made of paper, and commonly used by the Japanese, are of a whitish-brown color. Until a recent period, the Japanese were in blissful ignorance of the comfort of a cotton handkerchief, which is now an article of extensive exportation to this country and England. Among the many varieties of the Japanese fan is one which is employed in the battle-field as an arm of defense. It is made of paper, and is of larger size than usual, the sheath being of iron, so that, if fatigued by a

violent personal encounter, a warrior sits down a moment to rest and cool himself, and is unexpectedly attacked, he immediately hits his enemy over the head with his fan. These fans are only made to order, and are adorned with the national emblem—a red sun on a black ground. The fan is an inseparable part of the Japanese dress; and in strong contrast with those above mentioned, is a fan also made of paper, so thin and transparent that nothing can be conceived lighter or pleasanter to use. In the museum of the Department of Agriculture is a specimen of the beautiful transparent paper which is used for making such fans and other articles of extreme nicety and delicacy. The varieties of the paper fan of the Japanese would form a very curious collection in respect to form as well as quality. A Japanese is rarely without a fan. It is his shelter from the sun, his note-book, and his plaything. Without it he is as much at a loss as an American would be in unaccustomed company without a walking-stick, or something wherewith to occupy his hands.

EXPERIMENTS WITH CORN.

Very favorable reports have been received by the Department of experiments with "Cooley corn," distributed during the winter of 1871–'72. Among these may be noted the trial made by Mr. A. J. Wright, of Port Gibson, Claiborne County, Mississippi. Mr. Wright says:

> The Cooley corn received from the Department was planted March 8 and March 25, on land of moderate strength, with a slight broadcasting of ashes, plaster, and superphosphate. It yielded an abundance of choice roasting-ears by the 10th of June, proving about as early as the earliest garden varieties. The ears were of good size and handsome, and the yield very heavy, many stalks bearing three and in some cases four ears. Planted nearly a month after the "Peabody Prolific," it was in roasting-ear ten or twelve days in advance of that variety. We had some fine varieties of corn from Kansas, and some of the kinds usually planted here, but the "Cooley" was superior to any of them, except the "Peabody," concerning my experiment with which I submit a memorandum.

Mr. Wright states that he planted small quantities of corn received from Mr. Charles A. Peabody, of Augusta, Georgia, on the 10th and 30th February of the present year. It was in roasting-ear about June 25, giving an unusual yield, although not cultivated with any considerable care. Suckers shoot from the base to the number of two, three, and sometimes four, growing, in rich land, nearly to the size of the parent stalk, and bearing ears, so that there is sometimes a product of nine or ten ears to the single grain. The growth is very vigorous, yielding a large amount of fodder. It is thought by Mr. Wright that, with proper cultivation, it might yield on Mississippi fields as high as one hundred bushels per acre.

Cooley corn has succeeded well in Florida. Mr. J. D. Wolfe, of Pensacola, says that he marketed his product two weeks in advance of all other corn, and that for early maturity and productiveness it is unrivaled in that section. On one-sixth of an acre, although the season was unfavorable, he raised one hundred and ten dozen ears of good size, which netted in market $24.75, or at the rate of $148.50 per acre. Mr. W. planted his corn at different times, with reference to having roasting-ears, until the frosts in November. Having planted peas between the rows, he would have, in addition to his corn and pea product, corn-fodder and forage at the rate of two tons to the acre, the ground being cleared in time for a crop of turnips, ready for the market in January.

TREE-PLANTING FOR PROFIT IN THE MIDDLE STATES.

It has been shown by the result of actual experiments that timber-growing on the prairies and plains of the West is a profitable enterprise. Its profit has not been so clearly demonstrated in the Middle States, a country of natural forests, where neglected fields are constantly undergoing transformation from tillage lands to woodlands. Where the forests have been cleared, and population is dense, there is still an abundant and cheap supply of coal in the latter States; and though coal is abundant west of the Mississippi, the opened mines are at such a distance that corn is often used for fuel, and the planting of rapidly-growing trees becomes a necessity, and its practice is already proving a success. The question of the profit of similar enterprises on the Atlantic coast is an interesting one, which has occupied the attention of many practical minds. The following communication from a correspondent, Mr. Wm. C. Lodge, of Claymont, Delaware, presents facts and suggestions pertinent to this subject:

Though few experiments, and those generally on a small scale, have been made in timber-planting in this section, we yet have specimen plantations of all ages, from those but recently made to the towering groves of sixty years' growth, comprising all varieties of timber and cord-wood trees, showing the relative growth and value for mechanical purposes of the different trees common to this climate, and demonstrating the fact that larger trees and more valuable timber can be produced by culture than can be obtained from natural forests of equal age. Another advantage in artificial forests is the control of the varieties, which is, of itself, a matter of such importance as to render the artificial products more than double the value of the natural.

It is a well-known fact that the durability of timber depends upon the quality of soil in which it grows, the climate, and the age of the tree. As a rule, the strongest and most durable timber, particularly hardwood, is grown in a temperate climate, and in a clay or "white-oak" soil. While all varieties of the oak grown in high latitudes are comparatively soft and brittle, the same kinds grown between the thirty-sixth and forty-first degrees of latitude are more compact in texture, stronger, and more durable. The white oaks of Pennsylvania, Delaware, and Northern Virginia furnish timber for mills, ships, and other purposes where great strength and durability are required, almost equal to the live-oak of the South. A competent inspector will at once determine the locality in which the specimen submitted to his examination was grown, and tell whether it grew in a clay or sandy soil.

With the hints furnished by nature as our guide, we began the business of planting forest-trees. Our operations extend through a period of forty years, and our design, originally, was to utilize waste places, such as hill-sides difficult of culture, rocky fields, irredeemable swamps, as well as sterile or exhausted sand-beds. At the same time we planted a portion of our lands best adapted to general agricultural purposes, in all cases charging the crops with the cost of labor bestowed, the interest on the value of the land, and crediting it only with the products actually realized or carefully estimated.

We aimed to select such trees as were adapted to the soil and the situation. On our fertile "bottom-land" we planted the tulip-poplar for its clean, rapid growth, the white oak for its timber value, and the chestnut and honey-locust on account of their quick growth and durability as fence posts, railroad ties, and the latter especially for tre-nails, or trunnels for vessels. We also planted the black walnut and some other trees for their ornamental woods. It is needless to say that the best lands gave the most satisfactory results, and, with one exception, the largest clear profits.

The white willow plantation gave the largest returns for the capital and labor invested; but this was owing to the local demand for its wood by the extensive powder-works of the Messrs. DuPont, in the immediate vicinity.

The best or "bottom-lands" were planted after a previous corn crop with young trees taken from a nursery, two years old. The trees were planted in the intersections of the markings, leaving space for two rows of corn both ways between the rows of trees. The number of trees to the acre was somewhat over three hundred. Corn was planted between the trees annually until it ceased to be remunerative or interfered with their growth. This occurred in the fourth or fifth year. Thereafter the soil was once plowed and harrowed annually for about three years, when further care was

abandoned, except an occasional pruning or cutting away of such inferior trees as interfered with the growth of others more valuable.

The rocky fields and the hill-sides that did not admit of culture by horse-power were grubbed, spaded, and afterward planted, partly with young trees two years old, and partly with nuts and seeds. Most of the nuts either failed to vegetate or were eaten by mice and squirrels, and necessitated replanting with young trees. To these rough plantations we did not give much after-culture, but applied guano and wood-ashes to the soil, which produced a rapid and healthy growth in the young trees. Wood-ashes have, with us, proved the best fertilizer for young trees. We consider an application of leached wood-ashes almost indispensable for a young plantation of forest-trees unless the soil is already well charged with the elements of fertility.

The white-willow plantation was made on low, moist ground, partly in a swamp. Large slips or stakes about six feet in length are cut from the trees in March and April, sharpened at the large end, and driven a foot or eighteen inches into the yielding soil, or inserted in holes made with a crowbar. No further care is necessary until after the fifth year, when the branches may all be cut for the powder-mills, leaving a single main-stem about six feet in height. This stump immediately throws out a system of branches that may again be cut after a period of five to seven years. Periodical cuttings may thereafter be made every five years, which seem to invigorate the tree, and tend to form a crown, from which an increased number of branches spring forth.

The locust requires a deep, rich soil to produce the best results. It will bear cultivation in close thickets, and may be cut periodically every sixteen years. Our single half acre is a profitable portion of our forest plantation. The trees, two years old, were planted in good soil after a previous crop of corn, seven feet apart each way, with a row of potatoes between. They were cultivated one way for four successive seasons, when we ceased to plant the potatoes, and left the trees to take care of themselves.

The chestnuts were planted with the locusts, the same distance apart, and in the same manner, except that the nuts were planted instead of young trees. Once started, the after-treatment was the same as the locust plantation. Each are cut at intervals of about sixteen years, and the plantations thicken and increase greatly in value with every periodical cutting. Our chestnut and locust plantations have quadrupled in value after the two cuttings they have received. Three to six sprouts spring from every stump, each making a growth quite as vigorous and as much wood in the same time as did the parent tree.

The soil in which all our deciduous trees are planted is chiefly clay, or clay with a slight intermixture of loam. A sandy soil is more suitable for the pine, and even the barren sand-hills, occasionally found on the shores of the Delaware and Chesapeake Bays and along the Atlantic, may be utilized by the pine, and made to pay a fair profit on the timber product.

On a tract of sandy land, almost devoid of vegetable growth, in the county of Somerset, Maryland, is one of the most successful experiments in pine planting. The land had previously been in "common," in order to allow it to recuperate its exhausted energies by a period of rest. It was plowed, wood-ashes at the rate of twenty-five bushels to the acre spread over it, and the pine-seed was sown broadcast and brushed in. The whole business of planting and the care of the young trees is now finished, and we patiently wait ten, fourteen, or sixteen years for the crop. A better system of planting, and one that now generally prevails, is to strike out the ground and cross-mark as for corn, four feet apart, drop the seeds in the intersections and cover by hoe or plow. The young trees may thus be regularly cultivated, when they make a straight, rapid growth. It is estimated that a fine grove, carefully cultivated in this manner for a few seasons, will be as valuable in ten years from planting as that sown broadcast will be in sixteen years. Instances are not rare of plantations of pine in the better soils near the headwaters of the tributaries of the Delaware and Chesapeake Bays, after a growth of eighteen or twenty years, making sufficient cord-wood to cover the whole ground on which it grew, to a height of two and a half feet, or, in four feet ranks, leaving passages between the ranks three feet in width.

A recapitulation, showing the costs and profits of our timber-plantation, will, we believe, demonstrate the fact that timber-planting for profit may be successfully practiced in our best land in the Middle States.

Our first plantation of oaks, poplars, &c., made on our best arable land, is yet standing, and its value can, therefore, only be estimated. The corn for the five successive years after planting the trees paid the cost of the young trees, as well as the cultivation during that time. We shall only charge the trees with interest on first cost of the land and the taxes for forty years.

On a measured acre we have 112 white oaks, worth, standing, $8 each	$896 00
Eighty tulip poplars, $10 each	800 00
Eighty-two walnuts and other trees, worth $6 each	492 00
Total value	2,188 00

Deduct interest on cost, $60 per acre	$144 00	
Taxes for forty years, $2 per acre	80 00	
		$224 00
Leaves clear profit for forty years		1,964 00
From one-half acre of locusts we cut in sixteen years—		
111 railroad ties, 30 cents each		$33 30
131 fence-posts, 22 cents each		28 82
In thirty-two years, or next sixteen years, 387 railroad ties, 30 cents		116 10
10 cords of firewood, valued at $3 per cord		30 00
Estimated value of standing stock		150 00
Total products of half acre		358 22
Deduct interest and taxes forty years		112 00
Clear profits		246 22

The willow-plantation netted, gross, per acre, for the seven different cuttings that were made, the aggregate, $3,768, being the most profitable of any part of the plantation.

The plantation of pines on the comparatively cheap sandy land in Maryland, worth $20 per acre, cut from twenty to twenty-five cords of wood in fourteen years after planting the seed, valued at $7 per cord delivered at the railroad station. This wood is chiefly used for railroad and steamboat purposes, and is always in demand.

The value of the wood product is not the only consideration in the pine crop. The pine growth is a remarkable renovator of the soil. Comparatively valueless for agricultural purposes at the time of planting, the land is found to be in a high condition of fertility on the removal of the wood. From fifty to seventy-five bushels of corn per acre is frequently grown among the stumps with necessarily imperfect tillage.

Our most successful vineyards and peach-orchards follow a growth of pine. In the county of Sussex in Delaware, near the Atlantic sea-board, and in the counties of Kent and Talbot in Maryland, near the Chesapeake, are several of the finest vineyards in the whole country; and peach-trees attain a great age, and bear annual crops in these counties when they follow a growth of pine. Neither the curculio stings the young stoned fruit, nor does the borer injure the roots of the trees planted where pine recently stood. The plum, apricot, and nectarine succeed as well as the peach, so long as the land is "new," and although their exemption from injury by insects is, by some, attributed to the salt atmosphere wafted from ocean and bay, we are satisfied, by a course of experiments, that the chief benefit is derived from the resinous odors of the pine, for which the insects entertain a decided aversion.

It is not easy to draw a comparison between the profits of general agriculture and those of timber-planting, inasmuch as the former are realized annually, but the latter at long intervals. We have kept an accurate account with our farm for the whole period of our timber-planting, from which we present in the aggregate the following figures, running through a period of forty years:

Cr. by—		
6 crops of wheat, average 22 bushels per acre, price average, $1.25 per bushel		$165 00
6 crops of corn, average 48 bushels per acre, price average, 60 cents per bushel		172 80
12 crops of hay, average 1¼ tons per acre, price average, $17 per ton		225 00
16 years' pasturage, at $7 per acre		112 00
Forty years' total value farm products		674 80
From which deduct interest on cost of land, $60	$144 00	
Taxed for 40 years at $2 per acre	80 00	
		224 00
Leaving, without counting cost of labor and fertilizers		450 80
We have, therefore, the average timber products per acre for forty years		$2,058 00
Average agricultural products per acre for forty years		450 80

Making the timber crop more than *four times as valuable* as the cereal and grass crops for the same period, and leaving the land in a more healthy condition for orcharding and general cropping.

In the above comparison of the respective profits of forest culture and the ordinary products of agriculture, no allowance is made for compound interest upon the receipts of the farm during the forty years of forest growth, an item of considerable importance in the calculation.

ALFALFA IN CALIFORNIA.

The alfalfa, or Chili clover, (the lucerne of Europe, *Medicago sativa*,) is a plant of great importance to California. It appears to luxuriate in the climate and soil of the southern portion of the Pacific coast, pushing its tap-root to an extraordinary depth, and defying the effects of the severest drought. In response to a request from this office, Mr. N. Wyckoff, of Woodland, Yolo County, California, gives the results of his experience and observation as follows:

In the winter of 1854 I sowed four acres with some seed brought from Chili, and, so far as I know, it was part of the first parcel of seed introduced into this State. Mine, with that of many others who sowed that season, proved to be so very foul with mustard and kale, that after two years' effort to eradicate the pest I became disgusted and plowed it up. However, it gave evidence of being a desirable grass by its remaining green and growing through the whole dry season, and even in the warmer part of our winter, and by the fondness that the cattle evinced for it—they keeping it grazed close to the ground. Some clusters of that sowing which escaped the plow (for it has a very tough and wiry root, extending many feet into the ground,) are still alive, and compare favorably with the sowing of ten years later, and justify its German name of "everlasting clover."

In the winter of 1864 and 1865 I renewed my efforts, obtaining good, clean seed, and sowed twenty-five acres. The plowing had been done well, and early in the winter—two months before the time of sowing, which was about the middle of March—using ten pounds of seed to the acre. This proved to be light sowing; but it was fortunate for me, as it yields more and better seed when thin, thereby leading me to make the raising of seed a specialty. From this parcel of land I have gathered seed and sold to parties in nearly all the coast and valley counties of this State. From all I have received good reports.

From eight acres of this sowing, in 1869, I cut two crops for hay and one for seed, the first and third for hay. It yielded over five tons of seed, nearly 1,300 pounds per acre, and was sold for 25 cents per pound.

Its yield in some seasons is truly beyond credence. In 1870 I estimated the yield to be ten tons to the acre, and grazed the fields from the 5th of November to the 1st of April. In this county (Yolo) some have cut five crops during one summer. This was upon the Sacramento River, where the soil is a warm, light alluvial.

From Santa Barbara County I have advices that six and seven crops have been cut during one season; but there it is warm, and grows through the whole year.

Some cut when the growth has attained a height of two feet, without reference to its age or maturity. I am of the opinion that it ought to have a greater age to be of the highest excellence. My rule is to let it continue the blooming for ten days or more; it is then less washy and far better for horses than if cut earlier. For milch cows it is good at any age. Its quality as a hay for all purposes ranks below that of the wild or native oats of this country. The oats-hay we deem as good as the timothy of the Atlantic States; but alfalfa, grown upon the plains here, is better than any other clover I have ever had any experience with. For cattle, sheep, hogs, (when grazing or fed upon the hay,) and all stock not doing hard work it is superior.

Soil that is good for wheat and barley I find is good for alfalfa, but it especially delights in a warm, sandy loam. All alluvials are good. The class of lands upon which it is doing well around me, range from the first-named above to the adobe.

There is great advantage in fallowing for this crop. The time to plow is late in the winter or early in the spring, before the rains have entirely ceased. By thus exposing the soil to the sun during our long summer, all vegetation is destroyed; it should then be put in fine tilth by the plow, harrow, and roller, (if needed.) During September or October the seed may be sown and lightly brushed or rolled, but not harrowed after sowing, as the seed germinates well only on or near the surface. From 15 to 20 pounds are sown to the acre. Sowing at that time, if the rains come early and sufficient, it obtains a growth before the cold weather to withstand any frosts that we usually have here. But the best time to sow, for most seasons *here*, is the month of February or early in March. Thus, the ground having been deeply plowed early in the winter, then replowed or cultivated in February, or put in fine tilth—sow as above, 15 or 20 pounds to the acre, roll or brush, as the condition of the ground would indicate, and success usually follows. When the rains are well over for the season, say the 1st of June, or as soon as the growth is sufficient and the ground firm enough to prevent injury by trampling, let it be grazed closely, as it seems to improve it for a greater yield the second summer.

We do not usually cut anything from it the first season, pasturing it only; but on

the Sacramento River lands parties have cut two crops the first season, and it certainly can be done in some localities, when sown in the fall before the rains commence, and then followed by a warm winter.

With regard to making seed, I have letters from individuals living in the coast counties of this State, which inform me that within the fog belt, (a distance from the coast of 25 or 30 miles,) alfalfa does not make much seed, for the reason that the moist atmosphere induces a continuous growth of the stock, which thereby lodges badly. They speak of it as blooming, but the seed-forms do not fill. When sown thick it does not seed well here, but makes better hay and much better pasturage.

All the foregoing applies especially to California, and I may be asked whether, in my opinion, it would grow and do well in any of the Atlantic or Gulf States. I am fully of the opinion that it will do very well in any of the Southern States. In Mississippi and Louisiana, where I lived many years ago, I have the utmost confidence that it will do as well as here for grazing or soiling purposes; but as it would make a heavy growth, and as it cures slowly, it might be difficult to save it as hay in a climate where rain falls during the summer months.

I am satisfied that upon all the river bottoms and the cane-uplands it would take most readily, and yield in feed many times that of any grass cultivated there twenty years ago. It would have all the qualities of the Bermuda grass, which prevents washing off of the soil on the hill-lands, and a yield of feed astonishingly greater. I have sent small parcels of seed for trial to Tennessee, Illinois, Ohio, and Maryland, one each. From the latter only have I received any report. Richard Deaner, living near Keedysville, writes that it grew finely during the past summer, but that the frosts had cut it down to the ground. So I have seen it here; but the cold weather over, and a few days of warm sunshine, the fields are green again. My fields were cut down by frost last December, but now (February 10) the growth is one foot in height.

It has one grave fault, common, however, to all clover with which I have had anything to do; that is, when growing very rapidly, if cattle fill themselves with it quickly it gives them the *hoove*, or colic. This, probably, is caused by the rapid generation of gas in the rumen. I have not known it to affect other stock than cattle and sheep, and the latter in but few instances. When grazed closely it has no bad effect on any stock, not even that which other clovers have in some seasons of the year, viz., salivation. I have not seen the least sign of it in my experience.

You may have seen from the many notices in the California papers that it is becoming one of the prominent interests with the farmers here. The quotations of prices, wholesale, of seed in San Francisco, as may be seen in the papers, are from 15 to 17 cents per pound. My whole crop of seed is exhausted, before the season for sowing. I estimate that there will be over 10,000 acres sown in California this year.

AGRICULTURAL EXPERIMENTAL STATIONS.*

The utterances of Professor Liebig in 1840 created a general conviction that chemistry must become the basis of agriculture. From general science a sufficiently thorough and active furtherance of agricultural chemistry could not be expected; special institutions appeared necessary, in which chemical inquiries, with experiments in garden, field, and stable, could be connected with observations on vegetation and feeding, not on a small scale only, but also on large agricultural fields. The question of manures was the starting-point of scientific investigation, but this has now become secondary. "After chemical investigation, with its exact evidence, had found a secure foothold in the sphere of the nutrition of plants, it extended its efforts in a remarkably short time to an analysis of the soil, of animal and vegetable life, and of agricultural technic."†

In Germany the existing agricultural colleges took up the question of agricultural chemistry, and teachers like Stœckhardt, Sprengel, and Keckerlin, and others, attained early success in the experimental field. All these agricultural institutions in Prussia were furnished with gar-

* Prepared at the request of the Commissioner of Agriculture, by A. W. Angerer.

† Quotation from "The soil and agricultural condition of Prussia," page 547, article on Agricultural Experimental Stations, by Dr. A. Meitzen; Berlin, 1871.

dens and fields, chemical and physical laboratories, and carried out zealously the objects of experimental stations.

The first of these experimental institutions was established in England in 1842 by Mr. Lawes, on his estate of Rothamstead, and this served as a pattern for similar ones in Germany. The following list comprises the agricultural experimental stations in Europe at the present time:

Agricultural chemical experimental stations in Europe.

Number.	Name of station.	In what country.	When founded.	Name of director.
1	Rothamstead	England	1842	Dr. Gilbert.
2	Mockern	Saxony, kingdom	1851	Dr. Kuehn.
3	Chemnitz	do.	1853	Dr. W. Wolff.
4	Halle	Prussia, (province of Saxony)	1854	Professor Dr. Stohmann.
5	Prague	Austria	1855	Professor Dr. Hoffmann.
6	Bonn	Prussia, (Rhine province)	1856	Dr. Karmradt.
7	Dahme	Prussia, (Brandenburg)	1857	Professor Dr. Hedlriegel.
8	Pommritz	Saxony, kingdom	1857	Dr. Heiden.
9	Ida Marienhütte	Prussia, (Silesia)	1857	Dr. Brettschneider.
10	Heidau	Hesse, (electorate)	1857	Dr. Dietrich.
11	Weende	Hanover	1857	Professor Dr. Henneberg.
12	Intersburg	Prussia, (province)	1858	Dr. Habedank.
13	Carlsruhe	Baden	1859	Dr. Meszler.
14	Stockholm	Sweden	1861	Professor Dr. Müller.
15	Ultuna	do	1861	Profess'r Dr. Bergstrand.
16	Kuschen	Prussia, (Possen)	1862	Dr. Peters.
17	Brunswick	Brunswick	1862	Dr. Schultze.
18	Jena	Saxe-Weimar	1862	Professor Dr. Reichardt.
19	Dresden	Saxony, kingdom	1862	Dr. Hofmeister.
20	Regenwalde	Prussia, (Pomerania)	1863	Professor Dr. Birner.
21	Liebwerd	Austria	1864	Professor Dr. v. Gohren.
22	Munich	Bavaria	1865	Dr. Volland.
23	Hohenheim	Würtemberg	1865	Professor Dr. E. Wolff.
24	Koethen	Anhalt	1865	Dr. Heidepriem.
25	Salzmünde	Prussia, (Saxony)	1865	Dr. Grouven.
26	Memmingen	Bavaria	1865	Dr. Hirzel.
27	Lobositz	Austria	1865	Dr. Hanamann.
28	Bayreuth	Bavaria	1866	Dr. Spiesz.
29	Wiesbaden	Hesse-Nassau	1868	Professor Dr. Neubann.
30	Prilex	Austria	1868	Dr. Kohlrausch.
31	De la Malgrange	France	1868	Dr. Grandeau.
32	Vienna	Austria	1869	
33	Florence	Italy	1870	
34	Turin	do	1870	Connected with the Museum of Industry.
35	Gemblaux	Belgium	1871	The first in this country, and in connection with agricultural colleges.
36	Eldena	Prussia, (Pomerania)	------	Dr. Trommes, Dr. Scholz.
37	Poppelsdorf	Prussia, (Rhine province)	------	Dr. Ritthausen.
38	Berlin	Prussia, (agricultural institute)	------	Dr. Eichhorn.
39	Halle	Prussia, Saxony)	------	Professor Dr. Kuchn, Dr. Lehde.
40	Görlitz	Prussia, (Silesia)	------	Agricultural Association, Mr. Peck.
41	Göttingen, (agricultural institute.)	Prussia, (Hanover)	------	Dr. W. Wicke.
42	Altmorschen	Hesse-Nassau	------	Dr. Dietrich.
43	Cappeln, (agricultural col'ge.)	Schleswig-Holstein	------	Dr. Pieper.

The work of these stations is by no means exclusively theoretical. Practical purposes had called for their establishment and have demanded their continuance. The station of Halle controls 8 deposits of manures, and makes several hundred analyses every year. The station at Bonn superintends 34 deposits and manure factories; that at Dahme controls 2 deposits. Ida Marienhütte manages a superphosphate factory and the manufacture of sulphuric acid. All stations perform technical and chemical tests in the interests of farmers, such as analysis of soil, &c., to a great extent, and derive therefrom a part of the means for their maintenance. Among the tasks undertaken are various examinations of soil; the physiology of plants and animals; the chemical and physical prop-

erties of arable land; the component parts of well-water; observations on the temperature of the soil; amount of carbonic acid in the atmosphere of stables; experiments with manures; planting of various seeds; raising of plants in pots with water and quartz-sand, different salts, and combinations of nitrogen; experiments on the nourishment of grasses through river-water; duration of life and degree of hardiness of injurious plants; influence of various methods in drilling; causes of the potato-disease and its antidotes; inquiries into the nutrition of animals, the manner and measure of respiration, and the influence of various kinds of feed; experiments in fattening; inquiries into the process of life in trichines, worms, &c.; experiments in breeding, &c.

In Prussia the control over experimental stations is vested in a "central commission for experiments in agricultural chemistry," the present chairman of which is Dr. Von Nathusius, privy high councilor of state, president of the state agricultural board, and assistant to the minister of agriculture. One of its members is Mr. Von Salviati, privy councilor of state, secretary of the state agricultural board, and editor of the "Annals of Agriculture" for the Prussian states. Dr. Luedersdorff, Dr. Eichhorn, and Dr. Pringsheim complete the committee, which is under the direct jurisdiction of the minister of agriculture.

The officers in charge of the various experimental stations report to this central commission, and are subject to its direction in regard to investigations to be made in the interest of the state. Thus a number of stations are engaged in the analysis of imported manures, (guano, &c.,) which of late have been much adulterated, the design of the government being to prevent dealers from imposing on farmers in this article of trade.* The results of experiments are communicated to the central commission, to which they serve as bases for reports to the minister of agriculture, and are published in the official annals of that department. The following are illustrations of some of the titles of these reports: "Report of the central commission for agriculture (chemical experiments) on the inquiries by agricultural academies and experimental stations into the usefulness of kali preparations as manures." "Report of the central commission, &c., on experiments made by agricultural academies and experimental stations in the cultivation of poppy, for the purpose of obtaining opium." "Report of the central commission, &c., to the minister of agriculture on the labors of the experimental stations in 1869 and 1870."

The experimental stations of Prussia show the following receipts for the year 1870:

	From the state.	From agricultural associations.	From private sources.	All other sources.	Total.
	Thaler.	*Thaler.*	*Thaler.*	*Thaler.*	*Thaler.*
Halle	1,200	.....	.....	4,520	5,720
Regenwalde	1,600	580	.....	150	2,330
Bonn	800	842	.....	400	2,042
Kuschen	1,050	328	.....	140	1,518
Insterburg	900	350	.....	62	1,312
Ida Marienhütte	1,100	300	.....	1,807	3,207
Dahme	3,025	450	150	300	3,925
Weende	1,400	1,875	.....	58	3,333
Altmorschen	1,300	123	258	150	1,831
Wiesbaden	1,800	.....	.....	249	2,049
Proskan	†	.....	.....	2,642	.....
Poppelsdorf	†2,410	.....	.....	.....	.....

* That this trade is very considerable is shown by the fact that in 1869 Germany imported, through the port of Hamburg alone, 92,305 tons of guano, phosphates, &c.

†Paid from college fund.

The ordinary expenditures for agricultural objects by the Prussian state, exclusive of cost of administration, salaries, and construction of buildings, has been for the following purposes alone:

	Estimates.								
	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.
	Thaler.	*Thaler.*	*Thaler.*	*Thaler.*	*Thaler.*	*Thaler.*	*Thaler.*	*Thaler.*	*Thaler.*
For general scientific purposes.	45, 495	41, 257	43, 867	44, 162	44, 277	42, 493	92, 225	103, 619	150, 180
Agricultural academies*	53, 809	55, 539	32, 905	34, 349	34, 051	39, 261	45, 408	60, 603	69, 314
Other agricultural institutions.*	.....	.....	22, 340	22, 639	20, 358	18, 460	35, 903	40, 343	56, 200
Special purposes	6, 299	6, 049	5, 799	5, 799	5, 799	8, 171	15, 006	17, 329	28, 309
Premiums, (horse-raising)	23, 060	24, 200	24, 200	23, 615	22, 131	30, 016	61, 143	64, 604	102, 238
Total	128, 663	127, 045	129, 111	130, 564	126, 616	138, 401	249, 685	286, 498	406, 241

According to the report on the work of the experimental stations during the year 1870, Eldena made experiments with 13 kinds of wheat, 6 of rye, 9 of barley, 15 of oats, 7 of clover and grasses, 11 of turnips, and 14 of beet-roots. At Proskau experiments were made in planting potatoes after the system of Gulich; at Poppelsdorf inquiries into the proteine substances of barley, buckwheat, ryes, &c., were continued. At Halle they experimented in fattening with twelve sheep to compare the effect of rapeseed-cake and of lupines, and examined the process of nutrition in milk-producing animals. Among other subjects of inquiry at the experimental stations of Prussia may be mentioned the calcination of trichines; the transfer of the French disease from cattle to rabbits; the wool production of common races of sheep; the breeding of such races among themselves and with negretti; trials to prevent potatoe disease by petroleum; comparative methods of raising hops; cultivation of wheat after the Lois Weedon system; the influence of salt kali on the vegetation of the beet-root; the absorbtion of albumen in the process of digestion in ruminating animals; the variations of temperature at various depths of the soil; comparative experiments with potash, sulphate of magnesia, gypsum, &c., on plots in clover and grass, &c., &c.

Most of the experimental stations owe their existence to the agricultural associations; the one at Insterburg was established by the Central Association for Litthauen; that of Kuschen by the combined efforts of the agricultural associations of two districts; the Pomeranian Agricultural Society founded the station at Regenwalde, and an association of farmers of various districts established the experimental station at Dahme. The excellent experimental station at Ida Marienhütte, near Saaran, belongs to the Agricultural Central Association of Silesia, and is administered by a special board of trustees; those of Halle and Bonn also have been founded by the local agricultural associations.

In the Kingdom of *Saxony* the chemical physiological experimental station of the agricultural institute in the university of Leipzig is munificiently provided with apparatus and materials for demonstrations of all kinds. Great opportunities for investigation are offered by the extensive laboratories and collections of the University of Jena to the chemical experimental station connected with the same. There is also, since 1840, in the vicinity of Jena an experimental and model farm, conducted by Mr. Sturm, the renter of the estate.

* From a table appended to the July and August number of the Prussian Annals of Agriculture it appears that the state contributed in 1870 to twenty-seven agricultural academies and schools alone, exclusive of colleges, from which have graduated since their existence 5,865 scholars, (4,701 Prussians and 1,164 foreigners,) 38,428 thalers. To these schools belong 16,293½ morgen land for farming and experimental purposes.

The arrangements for agricultural experiments in *Bavaria* are at present subject to a re-organization, which has for its principal aim to separate the various classes of work, according as they require more scientific research or more practical experimenting, and to make distinct gradations in the character of experimental stations.

In order to satisfy the requirements of science as well as of practice, the whole matter will be directed by a commission consisting of representatives of science, such as Liebig, Voit, Nageli, Lehmann, and of intelligent landowners. For the whole of Bavaria only one station will be provided with all scientific means and materials; it is to be established in Munich as the central experimental station, and shall devote its investigations to scientific researches in the interest of agriculture exclusively. Professor Lehmann is engaged in its organization.

For experiments in a practical direction the Central Agricultural Academy at Weihenstephan has been selected. This has a very large area and great stocks of cattle, and this affords opportunity for extensive experiments in manures and feed. Moreover, the trustees of the six agricultural schools in Bavaria have placed at the disposal of the committee fields and manures for use in experimenting with special reference to the various influences of climate and soil on farm products. Teachers of real and trade schools in the state, having a laboratory at their service, shall be intrusted with work involving the solution of agricultural problems, and receive instruction from the central experimental station in Munich. It is intended in this way to direct the whole experiments, scientific and practical, by the central experimental station at the capital.

In the Kingdom of *Würtemberg* an agricultural chemical experimental station has been attached to the Royal Agricultural Academy at Hohenheim, near Stuttgart, since 1865. It has its own separate buildings, chemical laboratory, experimental stables, hot-houses, and fields. The state contributes annually 3,500 florins, ($1,435.) Its director is Dr. Wolff; assistant director, Dr. Funke; station chemist, Dr. Kreuzhage; second chemist, Dr. Fleischer.

The grand duchy of *Baden* founded at Carlsruhe, in 1859, a chemical experimental station, which is under Dr. Nessler, with two assistant chemists.

The experimental station at Weisbaden in *Hesse-Nassau* is chiefly devoted to the interest of grape culture. Among the investigations made in this institution are, examination of grapes during the period of ripening; comparative examinations into the weight and analytical properties of phosphoric acid; comparative examinations of the method to determine tartar and acetic acid in wines; a full microscopic and chemical analysis of Ahr wines, by request of the agricultural society of Rhenish Prussia; the quantitative analysis of tanning substances in oak-bark; analysis of seventy different German, French, and Austrian red wines.

The agricultural chemical experimental station at *Vienna* has recently published its programme, which contains an abstract of its statutes, instructions for the control of manures, and the tariff for various analyses.

The agricultural experimental station in *Italy*, established, by royal decree of April 8, 1871, in Turin, has also published its programme. It purposes to make analyses of soil, of water, and of manures in regard to vegetation; to examine and test agricultural machines and tools, and to publish the results. It will render an annual report to the minister of agriculture. Pupils may be admitted, some free, (receiving from the state 200 lire per year,) and others paying 160 lire or $32 per annum.

Belgium established its first experimental station at Gembloux, toward the close of 1871.

Every one of the agricultural experimental stations is under the direction of, or provided with, experts in chemical science. Many of the results of their investigations are published in the different states, in the official organs of agriculture, and the periodicals of agricultural associations. There is also a large literature in this field. A very interesting report of the Central Commission of Prussia, on inquiries into the disease and growth of potatoes by the experimental stations, is found in the Annals of Agriculture, No. 1, 1871. The "Composition and nutritive value of pasture-grass" is the subject of another valuable article in No. 2 (February and March) of the same. A report on "Trials regarding the porosity of building materials, and the natural and artificial change of air, especially in stables," by the experimental station at Halle, is found in Nos. 10 and 11. The annual report of the central commission of Prussia for experiments in agricultural chemistry, (No. 9 (September) of the Prussian annals,) gives detailed accounts of the finances and working of these institutions in 1870.

AGRICULTURAL ASSOCIATIONS IN GERMANY.—Agricultural associations are organized in Germany in almost all agricultural districts; they generally combine into a common central association, of which there is one, and in some cases more than one, in a province. Other associations are independent. The local agricultural published organs, and the experimental stations established by agricultural associations, are under management of the central associations.

Provinces.	Associations in 1868.				Members in 1868.			Finances in 1868.		Annual receipts, exclusive of state contributions, in 1868.							Associations which furnished no report.	Associations in 1870–'71.			
	Total.	Central or provincial.	District or branch.	Independent.	Honorary members.	Paying members.	Total.	Capital.	Debt.	Fees of admission.	Regular contributions from members.	Extraordinary contributions or assessments.	Interest of capital or rent of land.	From city or communal funds.	From fire and other associations.	From various other sources.	Total.		Central or provincial.	District or branch.	Independent.	Total.
								Thalers.	*Thalers.*	*Thals.*	*Thalers.*	*Thals.*	*Thalers.*	*Thalers.*	*Thalers.*	*Thalers.*	*Thalers.*					
1. Prussia	118	3	95	20	355	4,950	5,305	25,305	428	119	9,217	403	1,319	4	60	3,260	14,202	6	3	94	23	120
2. Posen	32	2	21	9	27	2,173	2,200	8,824	.....	10	3,753	218	364	180	.....	1,808	6,315	3	2	32	9	43
3. Pomerania	38	2	33	3	89	2,195	2,284	4,500	4,000	19	5,404	.....	161	.....	1,328	403	7,315	3	2	31	4	37
4. Brandenburg	67	3	52	12	265	6,067	6,332	48,763	35	254	16,066	876	2,681	542	1,383	21,044	42,276	2	3	50	25	78
5. Silesia	81	1	54	26	501	8,544	9,045	122,123	1,500	289	19,473	1,667	3,904	110	.....	8,662	34,105	3	1	49	49	99
6. Saxony	83	1	66	16	332	8,019	8,351	17,557	251	171	7,792	397	714	20	4,563	328	14,285	3	1	71	16	88
7. Westphalia	58	5	40	13	1,118	13,791	14,909	28,586	2,771	120	11,756	64	1,066	875	3,011	2,716	19,608	1	5	43	37	85
8. Rhine provinces	87	1	60	26	858	22,795	23,653	17,424	1,602	52	41,798	1,038	1,264	680	3,215	13,199	61,246	4	1	61	23	85
9. Hohenzollern	5	1	4	....	.....	1,772	1,772	1,424	.....	25	538	.....	116	128	73	101	951	....	1	4	....	5
10. Hanover	163	9	130	24	543	23,751	24,294	43,632	1,542	2,154	21,102	492	1,140	1,819	6,274	3,325	36,306	1	10	135	28	173
11. Hesse-Nassau	44	2	35	7	523	6,158	6,681	21,959	6,240	231	7,682	384	644	6,477	1,142	7,692	24,255	....	2	37	7	46
12. Schleswig-Holstein	43	1	28	14	199	4,971	5,170	13,567	530	71	6,006	.....	524	42	.....	762	7,405	4	1	35	15	51
Total	819	31	618	170	4,810	105,186	109,996	353,674	18,899	3,548	150,587	5,539	13,099	10,877	21,349	63,300	268,299	30	32	642	236	910
Of which belong to central associations	649	31	618	....	3,557	81,678	85,235	276,319	14,626	931	94,876	1,047	9,834	3,473	20,893	14,471	145,525	17	....	....	....	....
Independent	170	....	....	170	1,253	23,508	24,761	77,355	4,273	2,617	55,711	4,492	3,265	7,404	456	48,829	122,774	13	....	....	....	....
Total, 1868	819	31	618	170	4,810	105,186	169,996	353,674	18,899	3,548	150,587	5,539	13,099	10,877	21,349	63,300	268,299	30	....	....	....	....

II. *The present German Empire.*

	Central Associations.	Branch Associations and others.	Total.
Prussia	32	878	910
Kingdom of Saxony	5	354	359
Grand Duchy of Oldenburg	5	29	34
Duchy of Brunswick	2	10	12
Grand Duchy of Mecklenburg-Schwerin	1	26	27
Grand Duchy of Mecklenburg-Strelitz	..	4	4
Duchy of Lauenburg	1	..	1
Grand Duchy Saxe-Weimar-Eisenach	6	69	75
Duchy Saxe-Coburg-Gotha	4	15	19
Duchy Saxe-Meiningen-Hildburghausen	11	35	46
Duchy Saxe-Altenburg	..	8	8
Duchy Anhalt	1	8	9
Principality of Lippe	1	2	3
Principality of Schwarzburg-Rudolstadt	..	11	11
Principality of Schwarzburg-Sondershausen	..	6	6
Principality of Reuss, senior and junior	..	11	11
Principality of Waldeck	..	3	3
Free City of Hamburg	..	3	3
Free City of Lubeck	..	2	2
Free City of Bremen	..	2	2
Kingdom of Bavaria	1	30	31
Kingdom of Würtemburg	1	74	75
Grand Duchy of Baden	3	77	80
Grand Duchy of Hesse	3	7	10
Grand total	77	1,664	1,741

This does not include the following:
1. German Agricultural Society, established 1860, in Heidelburg.
2. German Fishery Association (1870) in Berlin.
3. South German Agricultural Society.
4. Central German Horse-breeding Society.

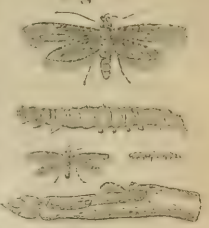
ENTOMOLOGICAL RECORD.

By Townend Glover, Entomologist.

Larvæ in Terminal Shoots of Peach.—In examining peach-orchards in the neighborhood of the Maryland Agricultural College, about the first week of May, almost all the young twigs of the trees were observed to be killed at the extreme point or end for a distance of 1 to 2½ inches, and the terminal buds entirely destroyed. On cutting open these dying twigs, the injury was found to be caused by a very minute caterpiller, which, entering the twig near a bud, had entirely eaten out the pith and interior, leaving only its "frass" and the exuding gum, to mark the spot where it had entered. When confined in a glass case, after about a couple of weeks, several of the larvæ left the injured twigs, and formed very loose cocoons on the sides of the box, or among the rubbish and old leaves lying scattered on the earth, and in about six to

ten days the perfect moth appeared. Specimens were forwarded to Mr. V. P. Chambers, of Covington, Kentucky, who is making a special study of our micro-lepidoptera, and he decided it to be *Anarsia* (Zeller) *prunella*, (Clemens,) probably *A. lineatella* (Zeller) of Europe, (Fig. 10,) the larva of which was described by Mr. Clemens as taken June 16, full grown, and about to transform on the limbs of a plum, but no food-plant is mentioned. The tail of the pupa is attached to a little button of silk, in an exceedingly slight cocoon. There was scarcely a single young tree in the peach-orchard examined, that was not more or less injured by this little pest, and at least as many as twenty to fifty injured twigs were found on some very young trees. After the insect leaves the twig, the injured part dries up and breaks off. This insect was also seen, though in much smaller numbers, last season, in Maryland and Virginia, and apple-trees are also frequently observed injured in a similar manner in Maryland, and it is probable that the damage is done by the same worm, but as we have not yet succeeded in breeding them from the apple, we cannot say with certainty.

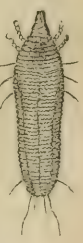
Fig. 10.



The larvæ are about 0.25 of an inch in length, head black, body dark reddish brown, with lighter rings, the third ring being more conspicuous and whitish; the moth is quite small, and measures 0.40 to 0.60 of an inch in expanse of wings, and is of a pale-gray color, with a few blackish spots on the upper wings. Should this insect increase in numbers as much during the next year as it has done since the last, it threatens to be a great scourge to peach-growers. The only way to destroy them is to go around the peach-orchard in May and June, and cut off such terminal shoots as appear to be withering or drying up, and then burn them with the caterpillars inside. This at least would prevent their multiplying to such an extent as to be very injurious at present. When not so very numerous, they appear only to serve to somewhat prune the trees, as they take off merely the tips of the branches.

Mites in pear-leaves.—In May many leaves of the pear-tree were observed to be covered with dark-brown blotches somewhat like a fungoid growth, but upon examination by Mr. Taylor, microscopist of the Department, these blotches were found to be inhabited by myriads of small mites almost invisible to the naked eye. These mites appear to run all over the leaves, but especially to burrow in the brown patches, which appear to be entirely eaten out by them. Their bodies are long, cylindrical, yellowish white, with only two pairs of legs, placed very far forward near the head, and they move with considerable agility. They are also marked with a multitude of rings, and have two long hairs or bristles and two shorter ones on the end of the abdomen. There is a somewhat similar mite mentioned by Packard as the *Pyphlodromus pyri*, of Sheuten, which is said to live under the epidermis of pear-leaves in Europe, but no mention is made o the brown blotches on the leaf, ap-parently formed by the mite. In his figure also the head is much more obtuse than those examined in the Department. A thorough drenching with whale-oil soap-suds would doubtless destroy many of them, as their bodies appear to be very soft. All infested leaves, likewise, should be immediately removed and burned as soon as discovered.

Fig.



Insect Injuries.—The Colorado potato beetle (*Doryphora decem-*

lineata) has made its appearance in Pennsylvania in two counties, in one of which the damage is reported as quite light. South of Mason and Dixon's Line this insect is reported in one county in each of the States of Virginia, North Carolina, Alabama, and Tennessee, but in all these the injuries are reported small. Their greatest annoyance is in the States north of the Ohio River. In Ohio several counties report greater or less injuries, not so severe, however, as those reported from Michigan. In Indiana this beetle is more or less destructive, while in several counties of Illinois it is despairingly pronounced a permanent scourge. In one county only (Outagamie, Wisconsin) are they pronounced worse than in 1871. In Minnesota and Iowa they are disappearing in most of the counties reported, while in Kansas they are but incidentally mentioned. In Clarke County, Virginia, the *Cantharis* or common potato beetle is injuring the crops to some extent. The counteracting agency of other insects destroying the Colorado beetle is mentioned with much satisfaction in different parts of the country. The ravages of this insect are comparatively trifling the present year. A correspondent in Erie County, Ohio, states that the Colorado potato-beetle abounds, this being their worst season; but by concert of action through the county it is kept in check; that when the weather is hot, the best way to destroy them is to keep the land well cultivated, and when the light, well-pulverized soil is hot, in the middle of the day, knock them off the vines, and the heat of the ground will kill them. When the weather will not admit of this, a tablespoonful of Paris green in a pailful of water sprinkled on the vines will be effectual.

CUT-WORMS.—The cut-worm is reported in a few counties of New England and the Middle States as destructive to corn, tobacco, meadows, and fruit. In North Carolina an insect, probably another variety of the cut-worm, is reported as injuring cotton. In Sullivan County, Tennessee, the worms are dug out of the ground, as many as sixty having been found in a single hill of corn. In Upshur County, West Virginia, and in several counties in Ohio, Michigan, and Indiana, the ravages of the cut-worm have been quite severe. This insect is occasionally mentioned in the reports from Illinois and Missouri.

LOCUSTS.—The locust or *Cicada* has made its regular seventeen-year visitation in Wise County, Virginia, especially injuring young fruit orchards. Locusts also are annoying the peach-growers of Madison County, North Carolina. In Red River County, Louisiana, they injured young cotton-plants. In Richland County they appeared May 14 and departed June 12. They were present in immense numbers in Laurel County, Kentucky, from May 13 to June 20, but did no serious damage. They were more destructive, however, in Shelby, Jefferson, Jackson, and Pulaski Counties. They are reported also in Highland County, Ohio.

APHIDES.—Aphides or plant lice have been found in the hops in Oneida County, New York. In Bladen, Moore, and Perquimans Counties, North Carolina, and in Marlborough County, South Carolina, this pest has been annoying to the cotton-planter.

CATERPILLARS.—A small, dark grey caterpillar has injured the gooseberries and currants in Lehigh County, Pennsylvania. Rice caterpillars have been destructive in the rice districts in Georgetown County, South Carolina, and in Glynn County, Georgia. In Crittenden County, Arkansas, caterpillars are at work among the apples. In Kane County, Utah, this pest is devouring the corn.

GRASSHOPPERS.—Grasshoppers are numerous, but not destructive, in Milam County, Texas, and are reported in Rice County, Kansas. In Morgan County, Utah, they destroyed half the spring grain and a fourth of the potatoes.

ARMY WORMS.—Ravages of insects bearing this name are reported in Pike and Posey Counties, Indiana, in White County, Illinois, in Jefferson County, Iowa, and in Nevada County, California.

CHINCH-BUGS.—The chinch-bug was destructive in Madison, Lawrence, Washington, Perry, Clinton, Clark, Crawford, and Effingham Counties, Illinois; in Polk, Jefferson, St. Clair, Lewis, Marion, Montgomery, Reynolds, Vernon, Harrison, Perry, Iron, Dallas, and Johnson Counties, Missouri; in Bourbon, Franklin, Miami, Osage, and Coffee Counties, Kansas, and in Thayer, and Nemaha Counties, Nebraska.

MISCELLANEOUS.—White grubs are complained of in Rhode Island, and Michigan; rose-bugs injured the grapes in Middlesex County, Connecticut. An unknown wheat fly is reported in Mechlenburgh County, Virginia. The wheat midge is reported in Putman County, West Virginia. Canker and measuring worms did great injury to the fruit in Delaware County, Ohio. In Lucas County, Iowa, an unknown insect seriously damaged the grapes and even killed the vines.

CHEMICAL MEMORANDA.

BY RYLAND T. BROWN, CHEMIST.

EXAMINATION OF MARLS.—The marls which are associated with the tertiary belt lying between the Alleghany Mountains and the Atlantic coast are of more importance to the agriculture of the country than has been recognized heretofore. They consist of an accumulation of the remains of marine animals, chiefly shell-fish, closely allied to the species now existing in the neighboring bays and estuaries. Sometimes, however, the teeth of the shark are found in a good state of preservation. These remains are commonly imbedded in a very fine sand, which, on first exposure to the air, has a dark green color, but, on drying, becomes an ash gray or light lead color. These beds vary in thickness from a few inches to 10 or 12 feet. In most of these the remains have not undergone petrifaction, though the animal matter appears to have been almost entirely removed. In consequence of this most of the shells will crumble into powder on exposure to the air. The amount of organic matter in these marls is, therefore, very small, but nearly all the mineral elements of these ancient organisms remain in a form which can be made available in the production of crops.

The phosphoric acid is chiefly in combination with lime as a neutral phosphate, and consequently is insoluble; but the disintegration of the shells reduces it to so fine a state of division that the phosphate, under the influence of carbonic acid, passes slowly into an available form. A portion, however, of the phosphoric acid is in combination with iron, from which it is readily liberated in the presence of potassa or lime.

The alkalies (chiefly potassa) are in combination with silica and iron, forming a double silicate of potassa and iron which is insoluble in water; but, on exposure to the air, the compound is broken up by the iron passing into the form of a peroxide, the remaining elements being resolved into silicic acid and soluble silicate of potassa, which is available for the use of crops.

The supply of marl in the belt above alluded to appears to be practicably inexhaustible; but the quality differs materially in the different beds even in the same vicinity, as will be seen by the following:

Analysis of marls from the vicinity of Marshall Hall, Charles County, Maryland.

No. 1.

Organic matter and moisture	2.030
Carbonate of lime	54.070
Carbonate of magnesia	1.304
Phosphoric acid	0.350
Peroxides of iron and alumina	2.955
Alkalies	1.000
Silica	38.291
	100.000

No. 2.

Organic matter and moisture	1.900
Carbonic acid	1.214
Phosphoric acid	0.653
Lime	9.465
Peroxides of iron and alumina	2.207
Alkalies	0.800
Silica	83.761
	100.000

No. 3.

Water	1.950
Organic matter	1.980
Carbonate of lime	35.504
Carbonate of magnesia	3.550
Phosphoric acid	0.210
Peroxides of iron and alumina	6.095
Alkalies	0.500
Silica	50.211
	100.000

No. 1 is a fair average specimen of shell-marl, containing in a ton (2,000 pounds) 1,080 pounds of carbonate of lime, 6 pounds of phosphoric acid, and 20 pounds of alkalies, chiefly potassa. No. 2 is a greensand marl, containing but 189.30 pounds of lime and 16 pounds of alkalies per ton, but giving 13 pounds of phosphoric acid in that weight.

The mineral elements for a crop of 25 bushels of wheat per acre (the straw being returned to the soil) will be furnished by 2½ tons of No. 1 or 1½ of No. 2 per acre. These marls, when dried, can be easily powdered, so that they can be readily distributed by means of a drill, or scattered broadcast over the ground. In this condition they may be mixed with bone-meal, superphosphate of lime, guano, or any other fertilizer that the farmer may choose to use. The marl, fresh from the bank, may be composted with barn-yard manure to a good advantage.

The large amount of lime and sand with which its more valuable ingredients are mixed will forbid the transportation of this marl to any great distance; but farmers living within reach of them will find in these marl-beds a cheap and valuable means of enriching their soils.

MINERAL CONSTITUENTS OF WHEAT.—A series of very interesting experiments, conducted by R. Heinrich, are given in Ann. der Landwirltschaft. The object of the experimenter was to ascertain the relation which lime, potassa, and phosphoric acid bear to the several proximate elements of the grain. The grain was subjected to analysis at five different stages of its growth: 1. The ovaries were collected and analysed while the plant was in bloom. 2. Fourteen days later another examination was made. 3. At the end of another fourteen days,

when the wheat began to ripen, another analysis was made. 4. Seven days later the wheat was cut and analysed; and, 5, fourteen days after harvest the grain, thoroughly dried, was examined. This series of analyses appears to establish the following ratios: 1 part of potassa to 11 parts of gummy matter; 1 part of lime to 43 parts of woody fiber; 1 part of phosphoric acid to 2 parts of nitrogen in the albuminoid compounds of the grain.

The author dwells particularly on the ratio existing between the lime and the cellulose or woody fiber. If lime be deficient, true woody fiber will not be developed beyond this proportion, and the result will be that the straw, consisting of loose cellular structure, will be disposed to fall; for this ratio appears to relate to the straw as well as to the grain.

Tendency to "lodge" in grain has generally been attributed to a deficiency of silica in an available form in the soil; but these experiments seem to controvert that theory; yet there is a link wanting to secure the conclusion which the author reaches. If he had given us the proportion of silica at every stage of the growth, as well as that of lime, &c., we should have had an intelligible basis for a conclusion. In the enamel of straw the silica exists as a silicate of lime and potassa, and consequently must exist in definite proportions.

PRODUCTION OF NITROGEN COMPOUNDS IN SOILS.—In a French journal (*Comtes Rendus*) we find a very interesting account of a series of investigations relating to methods by which nitrates are formed in the soil. Two tracts were selected, adjacent to each other in the commune of Saussemesriel, and but a short distance from the sea-shore. One of these tracts was covered with an oak forest, and the other, originally in the same condition, had been in cultivation five years, and in that time had received two dressings of quicklime of 10,000 kilograms per hectare, each, (8,500 pounds per acre nearly.) This soil originally consisted of a clay highly charged with iron, mixed with a considerable quantity of fine gravelly sand derived from the Silurian sandstones.

The samples were selected after a long drought in the month of August, and consisted of both surface and subsoil, which were examined separately. On treating these soils with dilute acid it was found that the forest soil was entirely destitute of lime, while the cultivated field showed 1.583 per cent. of lime in the surface-soil and 0.609 in the subsoil.

A portion of soil from each of the fields (35 kilograms, or 72 pounds,) was subjected to percolation for the purpose of ascertaining its soluble contents. This solution was found to contain in 950 cubic centimeters, as follows:

	Forest. *Millig.*	Cultivated field. *Millig.*
Organic matter	155	70
Silica	35.5	29
Chlorine	600.5	207
Sulphuric acid	5.6	32.6
Nitric acid	0	707
Phosphoric acid and iron	5.7	5.8
Potassa	69	25.8
Soda	287.7	180.7
Magnesia	68.6	90

The remarkable feature in the above table is the entire absence of nitric acid in any combination in the forest soil, while that from the cultivated field shows a fair proportion, and yet no nitrogenous substance had been used as manures on that field.

The writer claims that the investigation proves that under favorable circumstances atmospheric nitrogen may be converted by quicklime into nitric acid, and thus made available for the use of crops. It remains, however, to be determined what are the peculiar circumstances under which this favorable action takes place. An inspection of the above figures will show the large amount of chlorine and the comparatively small proportion of soda in the cultivated soil. This chlorine must have been derived from the sea-spray, and was therefore originally in the form of chloride of sodium, but it now exists in combination with the metallic base of lime. The writer concludes that transformation of common salt into chloride of calcium constitutes the condition favorable to nitrification in the soil.

TEMPERATURE OF THE SOIL.—MM. Becquerel and Edm. Becquerel have published a memoir upon some observations made with the aid of an electric thermometer, so arranged that the temperature of places and objects at some distance from the observer may be determined. These gentlemen have applied it to the determination of the comparative temperatures of bare soil, and that covered with low vegetation. In order to obtain the average temperature for the year the observations were made during the last five days of August, the months of September and October, at the hours of six and nine in the morning, and three and six in the evening. The averages of these results were calculated and arranged in tables.

The instrument was placed under the soil at depths of 0.05 and 0.10 meter, (2 and 4 inches nearly.)

The average of the observed temperature (reduced to Fahrenheit) was as follows:

		2 inches.	4 inches.
August, 1871	Covered soil	72	71.8
	Bare soil	79	75
September, 1871.	Covered soil	65	64.8
	Bare soil	67	65
October, 1871	Covered soil	50.5	50
	Bare soil	50.6	50.4

The average of the morning observations, which were made at 6 o'clock a. m., shows clearly the cooling effect of exposure:

		2 inches.	4 inches.
August	Covered soil	68.8	69.9
	Bare soil	64.5	67.3
September	Covered soil	61	62.8
	Bare soil	58	59.7
October	Covered soil	49	50.5
	Bare soil	45	45.8

From the above figures we learn that the average temperature of the bare soil was 5.5 degrees higher than that covered with vegetation, but the morning temperature of the covered soil was 3.8 degrees warmer than that which was exposed.

CARBOLIC ACID FROM LIVING VEGETATION.—M. Broughton, government chemist attached to the cinchona plantations of Ootacamaud in India, has obtained carbolic acid from the *Andromida Leschmantii*, a plant which grows abundantly in that section. The product is less deliquescent than that obtained from coal-tar; but the method employed for obtaining it is too expensive to allow it to be placed in the market against the acid produced by the usual method.

ABSORPTION OF WATER BY LEAVES.—The recent investigations of M. Calliet on the absorption of water in the liquid form by the leaves of plants, have led him to the conclusion that plants do not absorb moist-

ure by means of their leaves when they can receive a sufficient supply through their roots; but when the ground becomes so dry that this source fails, if water be furnished to the leaves it will be absorbed by them. This is not a natural function of the leaf, but a vicarious action.

COMPOSITION OF CREAM.—An examination of the composition of cream, by Dr. Hamberg, in Stockholm, gives as the result in several analyses:

	Per cent.
Butter	29.46
Casein	4.22
Milk sugar	2.08
Coloring and extractive matter	0.56
Phosphoric acids and alkalies	0.22
Chlorides of soda and potash	0.18
Water	63.28
Total	100.00

The specific gravity of the milk was 1,0309; of cream free from milk, 1.0049 to 1.0055. At a temperature of 155 C., in ten hours 10.5 per cent. of cream raised, which was analysed by the method of Haidlen. A better cream, obtained in the fall, gave: Butter, 34.75 per cent.; other solid matter, 6.65 per cent.; water, 58.06 per cent.

Milk exposed to a high temperature gave a more concentrated cream, but less in quantity, and not proportionally rich in butter, while, when the milk was allowed to sour, the amount of coagulable casein was much increased.

CONSTITUENTS OF STUBBLE.—Dr. H. Weiske has examined the quantity and composition of the stubble left after harvest.

For determining the quantity, eight squares, in different parts of the field chosen, were dug ten inches deep, and the stubble separated by sifting and washing, then dried at 100° C., with the following results:

Name of plant.	Before drying, weighed—	After drying, at 100° C.	Estimated pounds weight, per morgen.*	Name of plant.	Before drying, weighed—	After drying, at 100° C.	Estimated pounds weight, per morgen.*
	Grams.	*Grams.*			*Grams.*	*Grams.*	
Lucern	475.8	427.8	5,544	Lupine	364.0	312.8	2,027
Red clover	451.9	394.3	5,116	Wheat	353.3	307.7	1,994
Esparcette	307.8	262.4	3,401	Peas	332.0	285.1	1,848
Rye	510.0	466.0	3,019	Serradella	163.3	138.5	1,795
Wund clover	255.8	221.5	2,870	Buckwheat	226.3	194.2	1,259
Rape	234.0	197.3	2,557	Barley	207.0	176.3	1,142
Oats	385.0	334.5	2,167				

* The Prussian morgen = 3,054 square yards or 0.6310 acre.

The great quantity of roots left by red clover may account for its value as a green manure. The difference would probably be still more decided if the portions growing below ten inches from the surface were taken into the account.

The following table gives the amount of organic matter, nitrogen, carbon, and ash:

Kind of plant.	Organic matter.		Nitrogen.		Carbon and ash free from carbonic acid.	
	In 100 parts.	Pounds per morgen.	In 100 parts.	Pounds per morgen.	In 100 parts.	Pounds per morgen.
Rye	68.70	2,074	1.25	37.56	31.30	945
Barley	80.92	924	1.15	13.20	19.08	218
Oats	61.78	1,339	0.71	15.36	38.22	828
Wheat	68.68	1,369	0.68	13.56	31.32	625
Red clover	78.48	4,015	2.15	110.04	21.52	1,101
Lucern	87.60	4,856	1.41	78.24	12.40	688
Esparcette	82.74	2,814	2.08	70.80	17.26	587
Wund clover	80.50	2,311	2.04	58.68	19.50	559
Serradella	82.54	1,482	2.07	37.20	17.46	313
Buckwheat	78.82	992	2.18	27.48	21.18	267
Peas	79.17	1,463	1.76	32.52	20.83	385
Lupine	84.45	1,711	1.76	35.76	15.55	316
Rape	86.00	2,200	1.37	34.92	14.00	357

The mean of two analyses of the ashes gives, by estimation, the following table of mineral constituents contained in a morgen of stubble:

	Rye.	Barley.	Oats.	Wheat.	Red clover.	Lucern.	Esparcette.	Serradella.	Buckwheat.	Peas.	Lupine.	Rape.
Lime	42.1	24.3	49.2	44.1	150.2	112.8	67.2	45.9	46.0	41.3	46.2	71.0
Magnesia	8.3	3.2	7.0	5.9	28.3	14.0	18.2	7.8	4.2	6.4	7.0	7.5
Pottassa	18.0	5.6	14.3	10.6	46.9	21.1	24.5	5.1	5.3	6.5	9.8	27.1
Soda	24.3	2.0	10.4	6.5	11.5	15.5	8.0	2.8	2.5	4.1	2.1	12.1
Sulphuric acid$_3$	7.0	3.2	5.1	4.3	14.9	10.7	11.9	5.3	3.9	5.5	4.1	17.9
Phosphoric acid$_5$	14.6	6.9	17.3	6.8	43.0	22.6	17.1	10.6	6.3	8.6	8.0	18.4

THE VALUE OF HUMAN EXCREMENT AS A FERTILIZER.—Mr. Lepmann, director of the Central Trial Station in Bavaria, makes an estimate by which to determine approximately the value, for fertilizing purposes, of the human excrement annually wasted at the city of Munich. After contrasting the practice among the Japanese of carefully saving and using every particle of such manure, with the practice in Europe of utterly wasting the same, and then sending fleets thousands of miles for guano to make up for that waste, he states that the amount of guano furnished by Peru yearly for the German fields is about 1,000,000 cwt. This contains 13,000,000 pounds (German) nitrogen, 12,000,000 pounds phosphoric acid, 2,000,000 pounds potash. The city of Munich contains 177,600 inhabitants, each of whom, according to statistics, consumes a daily amount of food the constituents of which are equal to 15 grams of nitrogen, 5 grams of phosphoric acid, and $3\frac{1}{5}$ grams of potash. This would make the total for one year 1,868,070 pounds of nitrogen, 622,690 pounds of phosphoric acid, 373 pounds of potash. But this does not all become waste; a portion is required for the growth of the non-adult population. According to the census of 1867 there were 73,556 of this class. Estimating the average yearly increase from infancy up to adult age at 4 pounds for each, the total yearly growth of human flesh, fat, and bones in the city, in one year, would be 294,224 pounds. This would require 10,386 pounds of nitrogen, 11,636 pounds of phosphoric acid, and 1,239 pounds of potash. Deducting these from the amounts included in the total of food consumed, and there will remain as the sum of fertilizing elements wasted in the human excrements of the city for one year, 1,857,714 pounds of nitrogen, of which the commercial value

is 866,934 gulden; 611,054 pounds of phosphoric acid, value 122,210 gulden; 372,375 pounds of potash, value 49,650 gulden; total value 1,038,794 gulden, equal to about $500,000. This sum would be still further increased by adding to it the value of the humus-forming constituents of the excrements wasted.

Mr. Lepmann states that Germany now possesses a system by which he is confident this enormous waste may be entirely prevented, called there the Tonnen (barrel) system. The city of Gratz, containing 80,000 inhabitants, has this system in use in every house, and has thus demonstrated the practicability of using it in large cities. As an illustration of the profit to be derived from human excrement when fairly tested as a fertilizer, Mr. Lepmann refers to the fact that between the years 1850 and 1864 the price of that obtained from the barracks increased forty-five fold.

BOTANICAL NOTES.

By George Vasey, Botanist.

The cotton-wood tree.—A correspondent from Hardin County, Iowa, (M. J. F. Hardin,) writes respecting the cotton-tree mentioned in the report of last month. The tree named in that report is the white poplar, (*Populus alba*,) an imported tree, which our correspondent has mistaken for the cotton-wood of the West. We quote his remarks because we think they will be of interest in the region from which he writes:

I read, in reference to the cotton-tree, that "there is a period of eight or ten days during which the air is filled with the cottony down of the seeds, causing much annoyance," which is literally true—and even more, a positive nuisance to every housekeeper who has this tree for shade. It fills the nose, and perchance the mouth, while asleep, and the eyes in addition while awake, the milk-pan, the cream-cup, and every closet or room where an open window or door will permit its ingress, and yet it is quite a popular tree with us prairie farmers, and is becoming more so from the fact of its hardiness and rapid growth, as every one who chooses can have the comfort of a shady grove of from 10 to 20 feet in height in *five* years. But my object in writing is to inform all who will profit by the information that there is no need of the annoyance referred to.

The cotton-wood is dicœcious, and hence all this annoyance of flying cotton can be prevented by taking cuttings from *male* trees only. The cuttings grow rapidly when set out in rows or in plantations for groves, and in *five* years' time will make *larger and finer* trees than *young trees* of 4 feet high transplanted at the same time, as has been proven by thousands of prairie farmers who have tried it. The selection of cuttings from male trees can be made about the 1st of June, when the cotton is flying from the female trees, but the male trees will be observed to have none. I would like to inquire if there is any distinguishing mark between the male and female cotton-wood trees except while in blossom. I have not been able myself, from close observation, to observe any difference, but still hope there is some one yet to be discovered. If there is, a person need not be confined to the time of flowering in order to select cuttings from male trees, which would be a great convenience to all cotton-wood planters."

We know of no distinctive mark between the male and female cotton-woods except that which is apparent at the flowering time. The male trees are in blossom and shed their pollen some two or three weeks before the female trees shed the seed. A little observation will distinguish the male flowers, but the proper way would seem to be to observe and *mark* a male tree and take cuttings therefrom at the most suitable time.

Our native oaks.—The North American oaks are a very interesting group of trees, and include a large number of species, each having

a more or less extensive range. In the district east of the Rocky Mountains we have about twenty-two species; west of the Missouri River they become very scarce, gradually disappearing before the base of the mountains is reached. The central chain of the mountains furnishes but one or two species. The western slope of the Sierra Nevada presents eight or ten species, and Mexico and Central America many more.

The oak family is, perhaps, on many accounts, the most valuable of forest-trees. Its value depends chiefly upon its quality and abundance as a timber-tree. It would be difficult to supply its place in ship-building and in many of the useful arts, including its extensive employment in the construction of railroads. Almost nothing has yet been done in this country in the way of planting or cultivating the oaks, but it is desirable that the attention of our people should be directed to the importance of this subject, and to the kinds most valuable and most easily cultivated. Although it is a tree of slow growth, yet, with our accustomed thoughtlessness for the future, we have pressed it into our service without stint or measure, and we are just beginning to wake up to a realization of the fact that we are ruthlessly destroying the noblest forests in the world without making provision for their reproduction. In order to facilitate the study of this noble genus of trees, and to direct attention to the different kinds, we propose to give a short account of their general characteristics and their classification.

The principal characters of the genus are as follows: Trees or shrubs with alternate leaves, and with sterile and fertile flowers separate; the sterile ones on slender, thread-like, drooping stems; the fertile ones small and inconspicuous, consisting of a three-celled ovary, inclosed by a scaly covering, which, when enlarged, becomes a kind of cup to contain the fruit or acorn. Although the ovary is at first three-celled, with two ovules in each cell, yet but one of the ovules is fertile, and that one enlarges to fill the whole cavity.

All our species of oaks are divided into two sections, distinguished by the time occupied in the full development of the fruit. First, those which mature the fruit in one season, and hence called annual fruited; and second, those whose fruit is two years in acquiring maturity, and called biennial fruited. The first section includes the white and chestnut-oaks and the live oak of the Southern States. Of these the leaves usually have blunt lobes; and the acorns are sweet or sweetish, and some of them edible. In this section the acorns are produced on the *new* twigs, *i. e.*, the twigs of the same season's growth, and they are generally more or less stalked. In the second section the leaves are either entire or lobed and bristle-pointed; the acorns are bitter, and are matured on the twigs of the last season, and *below* the new shoots. This section includes the red and black oaks, the Spanish and pin oaks, and the willow-leaved oaks. Although these are called biennial fruited, it is not meant that they produce fruit only once in two years. The *young* fruit is formed on the new twigs, but it remains in a dormant state until the second year, when it swells and matures. On these trees, therefore, there is usually a crop of young fruit and a crop that is maturing.

The following sketch will give a comprehensive view of the species east of the Rocky Mountains, with some observations on their range and variations:

SECTION 1.—ANNUAL FRUITED OAKS.

Bur-oaks.—Leaves lobed.

1. Bur-oaks—*Quercus macrocarpa*, Michaux.—This tree has its largest development in the Western States, particularly in Illinois, Wisconsin,

Minnesota, and Iowa. It was the principal tree of the oak openings of the West, which have nearly disappeared under the advance of cultivation. It extends sparingly into the Eastern States, being found in Western New York and in Western Massachusetts. It has its common name from the peculiar fringe of the cup, made by an elongation of the scales or modified leaves of which the cup is composed. The acorn is usually nearly and sometimes completely inclosed by the cup with its mossy fringe, hence it is sometimes called the overcup-oak.

2. Southern overcup-oak—*Quercus lyrata*, Walt.—This species is common in the Southern States. Chapman says, "Florida to North Carolina." Dr. Cooper extends its range to Louisiana and Mississippi. But inasmuch as it has recently been detected in Southern Illinois, it is probable that it is more extensively distributed than has been supposed. There is reason to believe that it will be one of the most valuable of the genus for cultivation. It has a large depressed acorn, mostly inclosed in the cup, which is not fringed on the edge. The leaves are from 5 to 10 inches long, rather crowded at the end of the twigs, bright green and shining above, and whitish on the under side.

3. Post-oak—*Quercus stellata*, Wang.—This is the *Quercus obtusiloba* of Michaux. It is usually a smallish tree, of very dense wood, which is especially valuable for posts. Its range is very extensive, being found in most of the States east of the Rocky Mountains, but the quantity is limited, except in certain localities. In some of the Western States it occupies large tracts of low land, which are called post-oak flats.

4. White-oak—*Quercus alba*, L.—This tree is probably more widely distributed than any other native tree, occurring, undoubtedly, in every State of the district mentioned. It is too well known to need any particular description.

Chestnut-oaks.—Leaves toothed but not lobed.

5. Chestnut-oak—*Quercus prinus*, L.—There is yet some confusion respecting the Chestnut-oak. Michaux made but one species with five varieties, but most botanists hold these, or several of them, to be distinct species. There is yet room for much investigation respecting them. The species we have named is called by Chapman the swamp chestnut-oak, from its growing in low grounds. Dr. Gray says, "Dry or moist ground, common southward, scarce northward."

6. Swamp white-oak—*Quercus bicolor*, Willd.—This is the *Quercus prinus;* var. discolor of Michaux. It has rather large obovate leaves, narrowed at the base, whitish downy underneath; with large acorns one inch long or more, which are long stalked and about half inclosed in the cup, which is sometimes a little fringed on the margin. It is quite a common tree on low grounds and river bottoms.

7. Yellow chestnut-oak—*Quercus Castanea*, Muhl.—This is a smaller tree than the preceding, growing on more elevated land, frequently on hill-sides and rocky ground. Its leaves much resemble those of the chestnut, (*Castanea vesca.*) The acorns are only about half the size of the swamp white-oak, and not stalked. It is quite widely distributed over the country, from Maine to Georgia, and on the west to Missouri and Arkansas, but quite sparingly in quantity.

8. Chincapin-oak—*Quercus prinoides*, Willd.—This is a shrub from 2 to 6 feet high, with leaves closely resembling in form those of *Q. prinus* but much smaller. It produces an abundance of small sweetish acorns, and is usually found on poor land. It is common in the New England States, and extends southward to Florida, and westward to Wisconsin,

Iowa, and Missouri. It is the variety pumila of Michaux. Dr. Gray, in one edition of his Botany, reduces it to a variety, but at a later date restores it to the rank of a species.

Live-oak.—Leaves mostly without teeth, evergreen,

9. Live-oak—*Quercus virens*, Ait.—This valuable oak is found as far north as Norfolk, Virginia, but principally farther south, where it becomes a large tree. On the west it extends to Texas. The timber has a world-wide reputation in ship-building.

SECTION 2.—BIENNIAL FRUITED OAKS.

Willow-oaks.—Leaves generally entire, thick, and persistent, and some becoming evergreen far south.

10. Upland willow-oak—*Quercus cinerea*, Michaux.—This is a small tree, occurring rarely north of North Carolina, but common in the dry pine barrens of the Southern States, and extending west to Texas. It has small lance-oblong leaves, white downy beneath. The acorns are small, roundish, and about one-third inclosed in the shallow cup.

11. Common willow-oak—*Quercus phellos*, L.—This is the willow oak of the Middle Atlantic States, extending south to Florida, and west to Kentucky. It is a pretty large tree, attaining a height of 50 feet, and is distinguished by its willow-like leaves. It is commonly found in low woods, or on the margin of swamps and streams. The fruit much resembles that of the preceding.

12. Shingle-oak—*Quercus imbricaria*, Michaux.—This is also sometimes called Spanish-oak, which name properly belongs to *Quercus falcata*. It is a tree of moderate size, with smoothish black bark, leaves 4 to 5 inches long, thick and shining, not toothed or lobed. The acorn is roundish, small, half an inch long, in a shallow cup. It is quite common in some of the Western States, becoming most abundant in Kentucky and Tennessee, and reaching westward to Arkansas and southern Kansas. Its wood is of little value, making even poor shingles.

Black oaks.—Leaves thick, broadest at the top, slightly lobed or entire.

13. Water oak, *Quercus aquatica*, Catesby.—This tree is a native of the Southern States, having its northern limit about Richmond, Virginia, and extending west to Arkansas. It grows from 40 to 50 feet high, has firm tough wood, with smooth bark, except on old trees. The leaves are very peculiar in form, being somewhat fiddle-shaped, or having a long narrow wedge-shaped base, expanded at the top into a broad, somewhat three-lobed summit. They are about 3 inches long, and 1 to 1½ inches broad at the top. The acorn is about half an inch long, in a shallow cup.

14. Black jack—*Quercus nigra*, L.—This is a small-sized tree, from 15 to 25 feet high, growing mostly in thin soil, and forming a dense roundish head. The leaves are thick and leathery in texture, 5 or 6 inches long, broad at the top, usually with three bristle-pointed lobes, gradually narrowed below, and having a very short stem or petiole. They are covered with a rusty down on the under surface, as are also the young twigs. The acorn is short and roundish, and about half inclosed by the rough-scaled cup. It ranges from New Jersey to Florida, and westward to Texas and Arkansas, being very abundant in some localities, and quite absent over other wide tracts of country.

15. Black scrub-oak—*Quercus ilicifolia*, Wang.—A small scrubby oak, growing from 3 to 8 feet high, and ranging, according to Dr. Gray, from New England to Ohio and Kentucky.

Red oaks.—Leaves mostly with deep-spreading lobes, bristle-pointed or sharp.

16. Spanish oak—*Quercus falcata*, Michaux.—This is a large tree, having a pretty wide range from New Jersey southward and westward, being most abundant probably south of the Ohio River. The leaves are usually long-stalked, large, and of peculiar shape, having on each side one or two long, narrow, somewhat hooked or sickle-shaped lobes, the point of the leaf generally with several long pointed teeth. The bark is said to be excellent for tanning The acorns are small, roundish, and in shallow cups.

17. Red oak—*Quercus rubra*, L.—The oaks of this division are much confused by common observers, and are indiscriminately called black oaks or red oaks. It is desirable, if possible, to have each common name specially applicable to one species. This will be done only as the result of closer discrimination of the different species. The red oak of the botanist (*Q. rubra*) is one of the largest of the family. Very large trees of this kind may often be found in bottom lands, having a trunk three feet or more in diameter and without branches to the height of 20 or 30 feet. The bark on large trees is very thick and deeply checked, and is valuable for tanning. The wood is coarse and poor. The leaves are usually large, with about four lobes on each side, which point forward quite uniformly toward the apex. The acorns are much larger than in any other oak of this division, and are quite constant in shape and size. The cup is always shallow, and about as wide as the acorn is long. The species is found over nearly the whole of Eastern North America.

18. Scarlet oaks—*Quercus coccinea*, Wang.—This species is probably more variable in leaf and fruit than any other of our oaks. It includes several varieties which some botanists consider distinct species. Its range is as wide as that of the preceding, and it is much more abundant. The leaves are usually more deeply cut, with more side lobes, the acorns smaller, and the cup smaller and deeper.

19. Pin oak—*Quercus palustris*, Du Roi.—The pin-oak has a wide geographical range, but is abundant only in certain localities. It is found in low and swampy ground, and in general appearance much resembles the scarlet oak. The leaves are shorter and more deeply divided, with only about three lobes on each side. The acorns are small and roundish, about half an inch long, and the cup very shallow. It extends, according to Dr. Cooper, from Massachusetts to the mountains of Georgia, and from Missouri to Texas.

20. Turkey oak—*Quercus Catesbæi*, Michaux.—This is a small tree occurring in dry pine barrens in North Carolina and southward to Florida.

21. Georgia oak—*Quercus Georgiana*, Curtis.—This is a shrub, growing 6 to 8 feet high, which seems to have been observed only on Stone Mountain, Georgia. It produces an abundance of small acorns.

Several of the above-named species present well-marked varieties, and there are also a number of somewhat local forms which are considered to be hybrids. The best time to study the oak is about the time of the maturing of the fruit, when fully developed leaves and well-formed fruit may be obtained from the same tree, and specimens of both should be collected for identification.

MICROSCOPIC INVESTIGATION.

By Thomas Taylor, Microscopist.

Fiji Island Cotton.—When water is poured from a pitcher it generally partakes of a spiral motion, sometimes from left to right, at

other times from right to left. The spiral motion is modified by the form of the surface over which it passes. Were the mouth of the pitcher plastic, the spiral motion would modify its shape, bringing it into harmony with that motion—the tendency of the water to move in a spiral direction, so far as it had force to overcome the resistance of the plastic substance, would shape it in harmony with that tendency.

The animal and vegetable kingdoms exhibit many examples of organic bodies partaking of the spiral form; many varieties of shells display perfect tapering spirals, and generally they take the same direction, viz, from right to left, viewing them with their apex turned from us. There are exceptions to this rule; some have been found with the spiral thread winding from left to right. Many vines exhibit this tendency, especially those of rank growth. It has been observed that persons who have suffered from headaches or from fever, frequently lose their hair. As a remedy shaving of the head has been resorted to with good results. The hair grows faster, but it has been found to become wavy with a tendency to twist or curl when very frequently shaved during a term of years. The human hair differs from hairs on leaves in its mode of growth in some particulars. It has individual roots, and springs from under the epidermis. The hairs, or cotton threads, of the cotton-seed resemble, in some respects, the human hair. They spring from under the outer dark-brown skin or testa, and individually exhibit root formation. When a section of the cotton-seed is examined microscopically, it is found to consist of three principal parts, viz. the outer coating or testa, under which is situated a lining membrane composed of a series of double cells surrounding and inclosing the nucleus; from these cells the cotton fibers proceed. When a small portion of this series is combined with a little gum-water and ground to a fine pulp, the cells, viewed with a one-eighth object-glass, will be magnified to about three-fourths of an inch in length. They are perfectly transparent, and are seen to be banded near their centers. The cotton-thread or fiber is supposed to be a flat ribbon, although, when examining several sections of the roots of the fibers, I was convinced that the fiber is a flat, hollow tube resembling a ribbon. The twisting tendency of the cotton fiber is well known, its flat shape favoring that tendency. If the fibers, when growing or passing from their cells, obey the law which regulates the motion of liquids, as pointed out, we can account in a measure for their twisting and as the spiral forms of water issuing from an orifice are regulated by the pressure of water and shape of orifice, so may the tendency of the cotton fiber to twist depend on the pressure of the circulating fluids. The experiments of Hales and Burcks show that the pressure of the ascending vine-sap is sometimes so great that it will raise a column of mercury 38 inches. The pressure of the ascending sap of the cotton-plant has not yet been examined. The ranker the growth, theoretically, the greater will be the tendency of the fiber to twist.

The Department is informed by Mr. Isaac M. Brower, United States consul at the Fiji Islands, that sea-island cotton, which is an annual plant in the United States, becomes perennial in those Islands, and that its growth is much more vigorous there than here, and that for a term of years there is a continuous crop from the same planting. He has plucked cotton from a plant five years old, but the fiber is defective in one particular, and is objected to by the Liverpool merchants. They informed him that they feared that Fiji cotton is subject to some form of disease which caused it to knot, a fault which may be seen with the naked eye. Mr. Brower placed a specimen in my hands

for microscopic examination. I placed one of these knotty specimens on a glass slide, put on it a drop of gum-water, over which I next placed a glass disk, pressing it down, and submitted it to a power of about 75 diameters. The nature of the knots, so called, became evident. The cotton fiber had, in consequence of an extreme twisting motion, become so intertwined that an artificial knot was formed. Mr. Brower stated, on seeing the nature of the knot under the microscope, that the present system employed to separate Fiji cotton from the seeds, viz, the use of *rollers*, is apt to draw the knotted fibers more tightly than would be the case if the cotton-gin was employed.

A series of microscopic investigations on cotton of various growths, quick and slow growing, might lead to some practical and valuable results. In the mean time, I would suggest, as the most effectual remedy, the frequent renewal of the seed in the Fiji Islands.

FACTS FROM VARIOUS SOURCES.

REMEDY FOR GRAPE-VINE ROOT LOUSE.—M. Rogiers, mayor of Poulx, in the Department of Gard, a prominent vine-growing district of France, proposes to the Agricultural Society of Hérault, as a tested remedy for the depredations of the *Phylloxera vastatrix*, the application of a pound of soot to the roots of each vine after a careful excavation of the earth, which is used to cover the soot. It is claimed that this application is effectual in destroying the insect as well as in preventing attacks.

RAMIE.—It is reported that at the first of July the crop on the ramie plantation of Mr. F. T. De Lacroix, New Iberia County, Louisiana, was fully matured. That planted last fall and this spring is short—not more than 2 feet in height; but the old crop is much better.

JUTE.—Mr. De Lacroix also has on his plantation several rows of the jute plant, the seed of which was sent to him by the Department of Agriculture. The plants are very vigorous, and the indications are that jute will thrive in that climate. It bears some resemblance to flax in appearance, as it is said to in fiber.

TREE CULTURE IN CALIFORNIA.—The legislature of California has passed an act the object of which is to encourage the culture of forest and timber trees. It provides—1. That the governor shall appoint three forest commissioners, and that a State forester shall be appointed by them at a salary of $175 per month. 2. That the State forester shall collect, exchange, grow, and import seeds and seedlings of forest and timber trees, and shall distribute them gratuitouly, but not more than 1,000 seedlings to one person the same year. For these purposes he is authorized to expend $3,000 per annum. 3. That the supervisors in each county shall constitute a forest board, to aid in properly distributing the seeds and plants. 4. That a sum not exceeding $500 may be expended in providing and distributing circulars in the interest of tree culture. 5. That the State forester shall have authority to expend $3,000 the first year, and thereafter $2,000 annually, in establishing and taking care of nurseries for rearing trees and acclimatizing foreign plants and trees; and that from these, shade trees shall be furnished for grounds and roads belonging to the State, counties, and cities. 6. That it shall be the duty of the State forester to collect and diffuse, in all practicable ways, information respecting the culture of forest

trees. 6. That every agricultural and horticultural society receiving aid in money from the State shall award 10 per cent. of the money so received in special premiums for the largest and best groves of planted forest and timber trees grown in five years from the time the act goes into effect.

PALMETTO LEAVES FOR PAPER.—Small shipments of palmetto for fiber have been reported heretofore. On the British steamer Darien, which cleared from Savannah for Liverpool July 6, Mr. Edwin C. Denig shipped four bales of palmetto leaves, which he sends to England to be tested as to their value as material for paper. As books and newspapers multiply rags diminish. The demand for other materials for the manufacture of paper is urgent and on the increase. The esparto grass—the "Spartum" of Pliny—which grows in Spain, Portugal, and Northern Africa, and which for some years has been very extensively used as paper-making material in Europe, is beginning to fail, making it necessary to secure some new fiber. Mr. Denig believes that palmetto leaves will compare favorably with esparto grass as material for paper, and that they can be profitably exported for that purpose.

SILK RAISING IN CALIFORNIA.—The impetus given to the raising of silk-worms in California was checked by the failure of the cocoon trade with Europe. The introduction of "family reels" for reeling the cocoons is not deemed desirable, manufacturers of silks usually preferring larger lots, carefully assorted, composed of threads which are uniform in size, luster, and quality. It is now proposed to establish, at central locations in silk-raising districts, reeling factories, or "*ateliers de moulinage*," as they are called in France, where cocoons may be reeled "into grege, trams, and organzines." These will afford a market to which small producers can bring their cocoons, and at which they can be assorted and reeled in uniform threads of different grades, and in quantities to suit manufacturers.

COMPARATIVE PROFIT OF SLAVE AND FREE LABOR.—A correspondent from Alachua County, Florida, states:

> I formerly owned 110 slaves and made 100 bales of sea-island cotton. I had a large stock of cattle, &c. I now own 2,000 acres, one-half cleared and fenced. In 1866 I worked 86 hands and 30 mules. Am now convinced from my own experience that four plows, with high manuring and diversity of crops, will furnish a better crop and income than those derived from all my former slaves.

CHINCH-BUGS DESTROYED.—Mr. J. Cochrane reports from Mason County, Illinois, that in the first five days of June nine inches of rain fell, as much as in the five months preceding. It destroyed nearly all the chinch-bugs.

GOOD SHEEP HUSBANDRY.—Mr. R. Dibble, of Beatrice, Gage County Nebraska, reports that he "went into winter quarters" with over 500 sheep, and lost only four during the winter. Out of 284 lambs dropped in the spring, he has, June 22d, 272 doing well. He thinks Nebraska is the best sheep country of which he has any knowledge.

COTTON FACTORIES IN THE SOUTH.—A South Carolina correspondent thinks that now is the time to bring the factories to the cotton. He represents that there is a great abundance of water-power in Greenville County, and advises factory men from New England, Old England, and the Northwest to come there and engage in the raising and manufacture of cotton in juxtaposition.

FIGS IN OREGON.—Mr. Charles C. Coe, of Hood River, Wasco County, Oregon, reports that that climate is fine for fruits of all kinds. A small

fig-tree in his garden, though liable to be killed by the cold of winter, has withstood it for two years and borne fruit.

ALMOND TREES IN TEXAS.—Mr. John W. Moore, of Georgetown, Williamson County, Texas, has four almond trees one year old, which appear to be as hardy as the fig-tree.

CORK OAK.—Mr. William H. Harris, Red River Landing, Louisiana, has a cork oak one foot in diameter, raised from an acorn obtained from the Agricultural Division of the Patent Office before the war.

THE NATIONAL AGRICULTURAL CONGRESS.—The Congress of the Cotton States, organized at Augusta, Georgia, in 1870, and the National Agricultural Association formed at Nashville, Tennessee, in 1871, met by previous appointment at Saint Louis, May 27, and were consolidated under the name of the National Agricultural Congress. The number of delegates present was about 400. Among the rules adopted by the new organization was one that there should be a vice-president from each State, to be nominated by its delegation when represented, otherwise appointed by the president of the congress. The principal offices were filled as follows: President, John P. Reynolds, of Illinois; secretary, Charles W. Greene, of Tennessee; treasurer, Lee R. Shryock, of Missouri. The vice-presidents chosen, as nominated by the several State delegations present, were: Alabama, C. C. Langdon; District of Columbia, John Saul; Georgia, O. H. Jones; Illinois, A. M. Garland; Indiana, F. C. Johnson; Iowa, J. M. Shaffer; Kansas, George T. Anthony; Kentucky, James H. Moore; Maryland, Henry A. Parr; Minnesota, J. H. Stevens; Mississippi, J. G. Worden; Missouri, A. B. Barret; Montana, Mr. McArdie; North Carolina, W. F. Cornica; Ohio, Norton S. Townsend; Pennsylvania, A. Boyd Hamilton; Tennessee, W. H. Jackson; Virginia, M. F. Maury; South Carolina, W. M. Lawton. The delegates, men of intelligence and high standing in the communities they respectively represented, seemed thoroughly alive to the importance of improvement in agriculture, as that branch of industry which is more general than any other, and upon the successful prosecution of which all others depend for their prosperity; enlightened and catholic views were expressed, a spirit of harmony and enthusiasm prevailed, and the deliberations generally were of a character to inspire the hope that this new organization will justify its name by the extent and efficiency of its influence in promoting the agricultural prosperity of the country.

THE HYDE STEAM-PLOW.—Another trial of this invention, claimed to be successful, was recently made at Obert's ranch, near Brighton, California. Since the trial last autumn changes have been made by which the working of the plow is much improved. Two steering-wheels have been substituted for one, and the driving-wheels have been widened from 15 to 30 inches. It is claimed that the machine now works well, both in tule and in hard-clay ground, turning up the soil so as to leave it light and sponge-like; not in long, straight, but in short, spiral furrows, thoroughly pulverized. Sixteen acres were thus broken up at the recent trial.

THE VALLEY OF THE RAPPAHANNOCK.—Mr. John A. Parker communicates the following interesting facts and opinions respecting this valley: He has traveled much in the United States, and somewhat in foreign lands, and yet he has never seen any country so highly favored by nature as the valley of the Rappahannock. But while nature has done everything for it, man has thus far done but little. It has great facilities for living on luxuries at a cheap rate; oysters, crabs, fish, and wild

fowls are afforded in abundance by its river and its tributaries; the lands are easy to cultivate, the means of improving them are cheap, and there are rare facilities for sending their products to the great markets of New York, Philadelphia, Baltimore, Norfolk, &c. Both the soil and the climate are favorable for the production of every species of grain and roots, and all fruits, except tropical, that can be produced in any State in the Union. Lands, partly covered with fine timber, and about one-tenth, on the average, under splendid cultivation, can now be bought for from $5 to $20 per acre. Lastly, in healthiness of climate, the valley will compare favorably with any portion of the United States.

Mr. Parker states that taxes are lower in Virginia than in any other State, with a single exception; and thinks that if emigrants would visit that valley, and examine the extraordinary inducements it offers, they would choose to locate there rather than in some new western section, which is destitute of schools, churches, and settled society. He adds the assurance that all settlers of industrious and moral habits, from whatever section and of whatever politics, will receive a cordial "highland welcome."

MARKET PRICES OF FARM PRODUCTS.

Articles.	July.
NEW YORK.	
Flour, superfine State ..... per barrel..	$5 30 to $6 00
extra State ..... do.....	6 30 to 7 30
superfine western ..... do.....	5 30 to 6 00
extra to choice western ..... do.....	6 15 to 11 75
extra southern ..... do.....	7 15 to 9 35
good to choice southern ..... do.....	9 40 to 12 75
Wheat, No. 1, spring ..... per bushel..	1 57 to 1 60
No. 2, spring ..... do.....	1 53 to 1 55
winter, red, western ..... do.....	1 63 to 1 67
amber, western ..... do.....	1 70 to 1 75
white, western ..... do.....	1 68 to 1 80
Rye ..... do.....	82½ to ———
Barley ..... do.....	Nominal.
Oats ..... do.....	43 to 46
Corn ..... do.....	62 to 65
Hay, shipping qualities ..... per ton...	23 00 to 24 00
prime ..... do.....	28 00 to 32 00
Beef, plain mess ..... per barrel..	8 00 to 9 50
extra mess ..... do.....	10 00 to 12 00
Pork, mess ..... do.....	13 00 to 13 50
prime ..... do.....	10 50 to 10 75
Lard ..... per pound..	8½ to 9⅝
Butter, western ..... do.....	11 to 16
State dairy ..... do.....	23 to 28
Cheese, western dairy ..... do.....	7 to 11½
State factory ..... do.....	7 to 12½
Cotton, ordinary to good ordinary ..... do.....	20½ to 23⅜
low middling to good middling ..... do.....	24⅝ to 27¼
Tobacco, lugs, all grades ..... do.....	8½ to 9½
common to medium leaf ..... do.....	9¼ to 10¾
Wool, pulled ..... do.....	50 to 60
tub-washed ..... do.....	75 to 80
California, spring clip ..... do.....	40 to 45
California, fall clip ..... do.....	30 to 32
Texas, inferior to common ..... do.....	30 to 43

Market prices of farm products—Continued.

Articles.		July.		
BOSTON.				
Flour, western superfine	per barrel..	$5 00	to	$5 50
western extras	do.....	6 25	to	8 50
western choice	do.....	8 50	to	11 50
southern extras	do.....	6 50	to	7 00
choice Baltimore	do.....	9 50	to	11 50
Wheat	per bushel..	1 55	to	1 80
Rye	do.....	95	to	1 00
Barley	do.....	75	to	1 20
Corn, southern yellow	do.....	68	to	69
western mixed	do.....	65	to	67
western yellow	do.....	68	to	69
Beef, mess	per barrel..	10 00	to	12 00
extra	do.....	12 00	to	13 00
Pork, prime	do.....	11 50	to	12 50
mess	do.....	14 00	to	14 50
Lard	per pound..	9	to	10
Butter, New York and Vermont	do.....	20	to	25
Canada, good to choice	do.....	20	to	24
western	do.....	15	to	22
Cheese, New York and Vermont, choice factory	do.....	11	to	12½
Ohio factory, good to choice	do.....	8	to	10½
Hay	per ton...	30 00	to	35 00
Wool, Ohio and Pennsylvania	per pound..	65	to	75
Michigan	do.....	62	to	70
other western	do.....	62	to	67
California	do.....	25	to	57
Texas	do.....	35	to	50
combing fleece	do.....	75	to	80
PHILADELPHIA.				
Flour, superfine	per barrel..	5 25	to	5 75
extra	do.....	6 00	to	6 75
family and fancy brands	do.....	7 50	to	11 00
Wheat, red, Pennsylvania and western	per bushel..	1 70	to	1 75
amber	do.....	1 77	to	1 80
Rye	do.....	65	to	———
Corn, yellow	do.....	64	to	———
mixed, western	do.....	63	to	———
Oats, western white	do.....	43	to	———
Pork, mess	per barrel..	14 00	to	14 50
Beef, mess, city packed	do.....	14 50	to	14 75
Lard	per pound..	9	to	9½
Cotton, middling	do.....	25¾	to	26½
BALTIMORE.				
Flour, superfine	per barrel..	6 00	to	7 00
extra	do.....	7 25	to	9 25
family and fancy	do.....	9 50	to	10 00
Wheat, choice red	per bushel..	2 00	to	2 10
white	do.....	2 00	to	2 10
Rye	do.....	98	to	1 05
Corn, yellow	do.....	67	to	68
white	do.....	77	to	79
Hay, western	per ton....	35 00	to	37 00
Pennsylvania and Maryland	do.....	33 00	to	37 00
Pork, mess	per barrel..	13 75	to	———
Butter, western, prime to choice	per pound..	10	to	17
New York	do.....	.....		.....
Cheese, western factory	do.....	13	to	———
eastern factory	do.....	.....		.....

Market prices of farm products—Continued.

Articles.		July.		
BALTIMORE—Continued.				
Lard	per pound	$0 8	to	$0 10½
Cotton, ordinary to good ordinary	do	20	to	23⅜
low middling to middling	do	24¾	to	25¾
Tobacco, common to good lugs	per cental	7 50	to	9 00
common to medium leaf	do	9 00	to	9 50
Wool, unwashed, free from burs	per pound	40	to	42
tub-washed	do	68	to	70
CINCINNATI.				
Flour, superfine	per barrel	5 50	to	6 00
extra	do	7 00	to	7 25
family	do	7 26	to	7 50
Wheat, No. 1, white	per bushel	----		----
No. 2, white	do	----		----
No. 1, red	do	1 55	to	1 60
No. 2, red	do	1 50	to	----
Corn, white	do	53	to	54
yellow	do	----		----
Oats, white	do	38	to	----
No. 1, mixed	do	37	to	38
Rye	do	75	to	78
Barley, winter, No. 2	do	60	to	75
spring, No. 2	do	60	to	----
Hay, common to choice	per ton	16 00	to	20 00
from store	do	18 00	to	23 00
Pork, mess	per barrel	12 00	to	14 50
prime	do	----		----
Beef, plate	do	11 00	to	11 50
hams	do	13 00	to	13 50
Lard, prime steam	per pound	8⅛	to	8¾
Butter, Western Reserve	do	18	to	20
choice Central Ohio	do	14	to	17
Tobacco, lugs	do	10	to	18
leaf	do	12	to	25
Wool, tub-washed	do	65	to	67
fleece-washed, manufacturing	do	55	to	60
fleece-washed, combing	do	65	to	70
unwashed, manufacturing	do	40	to	45
unwashed, combing	do	50	to	55
pulled	do	55	to	60
CHICAGO.				
Flour, winter extras	per barrel	9 50	to	----
spring extras	do	6 75	to	7 37½
Wheat, No. 1, spring	per bushel	1 21½	to	1 24½
No. 2, spring	do	1 20	to	1 23
No. 3, spring	do	----		----
Corn, No. 2	do	40	to	40½
rejected	do	37	to	----
Oats, No. 2	do	25⅞	to	26¼
rejected	do	22½	to	23½
Rye, No. 2	do	56	to	----
Barley, No. 2	do	52	to	56
Hay, timothy, (on track)	per ton	13 00	to	16 00
prairie	do	9 00	to	11 00
Pork, mess	per barrel	12 50	to	12 55
extra	do	----		----
Beef, mess	do	9 00	to	----
Lard	per pound	7¾	to	8¼

Market prices of farm produces—Continued.

Articles.		July.		
CHICAGO—Continued.				
Butter, choice dairy	per pound	$15	to	$0 17
fair to choice, tub and firkin	do	12	to	14
Cheese, New York factory	do	12	to	13
western factory	do	10	to	11
Ohio factory	do	10	to	11
Wool, medium fleece	do	59	to	62
unwashed, medium	do	43	to	45
tub-washed	do	60	to	73
SAINT LOUIS.				
Flour, superfine	per barrel	4 25	to	4 75
extra	do	5 00	to	7 50
choice	do	7 75	to	10 00
Wheat, red	per bushel	1 40	to	1 50
white	do	1 35	to	1 52½
spring	do	75	to	1 20
Corn, mixed	do	38	to	47
yellow	do	38	to	44
white	do	40	to	56½
Oats, white	do	29½	to	37
mixed	do	28	to	35½
Rye	do	58	to	62
Barley, winter	do	———		———
spring	do	40	to	55
Hay	per ton	18 00	to	21 00
Pork, mess	per barrel	11 80	to	12 25
Lard, prime steam	per pound	9¾	to	———
kettle	do	7½	to	8
Butter, choice	do	15	to	17
medium to fair	do	7	to	11
Cheese, choice factory	do	11½	to	12½
Cotton, middling	do	24½	to	25
Tobacco, lug	per cental	7 50	to	8 50
common leaf	do	8 25	to	9 00
medium to good leaf	do	9 00	to	11 00
Wool, tub-washed	per pound	65	to	70
fleece-washed	do	54	to	62
unwashed, medium	do	46	to	47
NEW ORLEANS.				
Flour, superfine	per barrel	6	to	6 75
extras	do	7 25	to	10 50
Corn, white	per bushel	69	to	70
yellow	do	———		———
mixed	do	57	to	58
Oats	do	40	to	46
Hay, choice	per ton	28 00	to	30 00
prime	do	26 00	to	27 00
Pork, mess	per barrel	12 50	to	13 15
Beef, mess, (Texas)	do	11 50	to	12 00
Lard, tierce	per pound	9	to	9¼
keg	do	10	to	10⅞
Butter, choice western	do	16	to	18
Goshen, choice	do	30	to	———
Cheese, New York cream	do	17	to	———
Western Reserve	do	12	to	12½
Cotton, ordinary to low middling	do	19¼	to	23⅝
middling to good middling		24½	to	———

Market prices of farm products—Continued.

Articles.		July.		
SAN FRANCISCO.				
Flour, superfine	per barrel	$4 50	to	$5 25
extra superfine	do	5 50	to	6 25
higher grades	do			
Wheat, State	per cental	1 75	to	1 90
Oregon	do	1 75	to	1 90
Corn, white	do	1 50	to	———
yellow	do	1 45	to	———
Hay, State	per ton	8 50	to	18 50
Pork, mess	per barrel	17 00	to	20 00
prime	do	16 00	to	———
Beef, mess	do	12 00	to	20 00
Lard	per pound	10	to	12½
Butter, overland	do	15	to	20
California	do	22½	to	25
Oregon	do	10	to	15
Cheese	do	12	to	16
Wool, native	do	30	to	———
California	do	35	to	40
Oregon	do	38	to	40

MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

AUGUST AND SEPTEMBER,

1872.

WASHINGTON:
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1872.

MONTHLY REPORT.

DEPARTMENT OF AGRICULTURE,
Statistical Division, September 23, 1872.

SIR: I report herewith, for publication, statements of the condition of farm crops, as shown in the returns for August and September, and statistics of market movements and prices, together with other matter representing the work of the several divisions of the Department of Agriculture.

Respectfully,

J. R. DODGE,
Statistician.

Hon. F. WATTS, *Commissioner.*

CONDITION OF THE CROPS.

CORN.

The condition of corn is better than for several previous seasons, throughout New England. The unusually warm weather, in connection with seasonable rains, which have kept green even the sandy plains of the coast section, has given high promise of a large yield, which early frosts can now scarcely impair. The Maine and Connecticut averages are 7 above; New Hampshire, 6; Rhode Island, 5; and Vermont, 2.

The average of condition in New York is 110, the best reports coming from the principal corn-producing counties, of which Livingston returns 125; Onondaga and Ontario 120; Wayne, 115; Dutchess, 110; and Suffolk and other large counties, 100.

The counties of Hunterdon, Monmouth, Salem, Warren, Morris, and Mercer, in New Jersey, yielding more than half the corn supply of the State, average 111, but the remaining counties reduce the general average to 110. Salem returns 95, and Atlantic 50; no other returns fall below 100.

In Pennsylvania, such counties as Lancaster, York, Washington, Bucks, Berks, Westmoreland, Cumberland, Centre, Montgomery, and Chester, none of which produce less than a million bushels, and some of them nearly three millions, average together 109, which is also the average for forty-one counties reporting corn.

Delaware, Maryland, and Virginia are the only States between Maine and Georgia which report the corn prospect unfavorable. The average for Delaware is 57, for Maryland 86, and Virginia 95. The reports from Virginia are variable, some "better than for years," as in Bath, while others give expectation of but half a crop. Accomack, which usually produces half a million bushels, returns condition at 110, while Fauquier, which stands second in corn production, makes its record 90.

North Carolina guarantees a large crop of corn. Only Edgecombe and Jones report low condition, ten counties average, and thirty-seven above, the average for the State being 112.

In South Carolina only four counties report less than 100, and the State average is 106.

In Georgia, where the average is 108, some of the larger corn counties make even more favorable returns.

In Alabama, Wilcox reports 150; Lawrence, 125; Dallas, 115; Montgomery, 110. These are among the heaviest corn-producers. Only three counties report low condition. Average, 107.

A large yield is promised in Mississippi, Louisiana, and Texas. Arkansas promises an average, and Tennessee 5 per cent. above.

In Kentucky, among counties usually producing over a million bushels each, Shelby is placed at 120; Jefferson, 110; and Fayette, 100. Only two are below average.

In Ohio, of forty-three counties reporting, only two are below average, seven average, and thirty-four above. Of sixteen counties, which produced twenty-three millions of bushels in 1869, Franklin and Warren report 125; Darke, 120; Coshocton, 115; Clinton, Miami, and Highland, 110; Licking and Fairfield, 100; and Montgomery, Ross, Fayette, Butler, Champaign, and Hamilton, 105.

From many of the principal counties in Michigan, including Jackson, Calhoun, Saint Joseph, Livingston, Branch, and Washtenaw, returns of 100 are made, while Oakland returns 95, and Hillsdale 80; the average for the State being 99.

Among the Indiana counties producing more than a million bushels each, Madison reports 125 for condition; Marion and Wayne, 110; Bartholemew, 108; Shelby, 105. The State average is 105.

Of fifty counties reporting in Illinois, thirty-two report high condition, seven low, and eleven average. Among those usually growing from two to six millions of bushels each, the following returns are made: Sangamon, 115; McLean, Mason, Macon, Tazewell, 110; Madison, 100; Champaign, 90. The general average is 107.

Wisconsin, like Michigan, falls a little below 100. La Fayette, second county in production in 1869, returns 120; Rock, 125; Iowa and Richland, 100; Green, 95; Fond du Lac, 85; Jefferson and Columbia, 80. In this State and Minnesota the average is the same, 98.

In Iowa the counties producing not less than a million bushels each, average 103, while the average for the State is 104.

The following counties in Missouri, which produce from one to two millions of bushels each, average 112, viz, Clay, Cass, La Fayette, Holt, Platte, Jackson, Nodaway, Boone, and Saint Louis; Cass and Saint Louis being placed at 100, and Nodaway at 125. The State average is 110.

In Kansas, Doniphan, the first in corn production, is reported at 110, as also are Atchison, Johnson, Bourbon, Miami, Shawnee, and Marshall; Brown and Pottawattamie, 125; Cherokee, 130; Linn, 120; Nemaha, 115; Jefferson and Coffey, 110. The State average is 112. Nebraska averages 111; California, 103; Oregon, 101.

The following is a classification of the September returns of corn:

States.	Average.	Above average.	Below average.	Total number of counties reporting.
Maine	4	6	.....	10
New Hampshire	2	5	.....	7
Vermont	6	4	.....	10
Massachusetts	3	4	.....	7
Rhode Island	1	1	.....	2
Connecticut	2	4	.....	6
New York	6	23	3	32
New Jersey	.....	10	2	12
Pennsylvania	6	33	2	41
Delaware	.....	.....	2	2
Maryland	2	1	8	11
Virginia	10	12	23	45
North Carolina	10	37	2	49
South Carolina	4	10	4	18
Georgia	15	26	9	50
Florida	3	2	10	15
Alabama	12	16	3	31
Mississippi	7	22	1	30
Louisiana	5	14	1	20
Texas	6	23	3	32
Arkansas	3	5	7	15
Tennessee	7	29	12	48
West Virginia	8	11	4	23
Kentucky	3	31	2	36
Ohio	7	34	2	43
Michigan	13	6	8	27
Indiana	12	25	10	47
Illinois	11	32	7	50
Wisconsin	5	5	12	22
Minnesota	6	4	5	15
Iowa	11	21	8	40
Missouri	9	37	8	54
Kansas	8	23	1	32
Nebraska	3	7	1	11
California	7	6	2	15
Oregon	7	1	1	9
Total	224	530	163	917

COTTON.

The county reports of the condition of cotton are less favorable in September than were the returns made in the earlier part of the season. Vigorous growth, stimulated by fertilizers and sufficient moisture, characterized the fields of the Atlantic States up to the season of the first picking, and gave promise of unusual fruitfulness. The plants were in many fields too stocky and succulent to withstand well the recent local droughts or to endure the draughts upon vitality consequent upon the maturing of their heavy burden of bolls, causing forms to drop and young bolls to wither. In exposed bottom lands, where sudden and heavy rains occurred, damage by flooding resulted. While a few reports allude to the presence of insects injurious to cotton, losses from that cause, in all the States east and north of Alabama, are less than usual.

Local droughts of considerable severity have prevailed for several

weeks in portions of the territory west of Alabama, while a sufficiency of moisture has been reported of the Atlantic States, and in many places an excess of rain is observed. Eleven meteorological stations, in different parts of North Carolina, show a record of rain-fall in August ranging from 2.60 inches in Granville to 7.80 in Mecklenburgh, and make an average of 5.27 inches. Three reports from South Carolina average 7.15 inches, the lowest rain-fall being in Newberry, where injury was wrought by "heavy rains followed by drought." The average of seven stations of Georgia was 4.18 inches, the lowest record being 2.70 at Fulton, and the highest 6.50 at Washington. The range in Florida was from 2.60 inches in Duval to 23.25 in Wakulla, and the average 8.90. The average of stations reported in other States is as follows: Alabama, 2.75 inches; Mississippi, 2.72 inches; Louisiana, 2.76; Texas, 1.44; Arkansas, 2.76; Tennessee, 3.06 inches, the range being very wide, 1.33 in Montgomery to 6.01 inches in Sumner.

The condition of the crop, as shown by the returns received in September, in comparison with those of August, is as follows:

	September.	August.
Virginia	97	101
North Carolina	101	99
South Carolina	95	98
Georgia	96	104
Florida	92	96
Alabama	88	107
Mississippi	90	112
Louisiana	86	101
Texas	94	103
Arkansas	78	96
Tennessee	92	104

Thus the prospect throughout the entire cotton area, which favored a yield 5 per cent. larger than an average product, promises at the present time about 9 per cent. less than an average. The increase of area over last year, and the unfavorable character of the season of 1871, still point to a material increase in the total crop of 1872, while the possible extension of insect ravages, or the early occurrence of frost, may modify the present expectation.

The only counties reporting cotton in Virginia, are Northampton, Southampton, King and Queen, Chesterfield, Greenville, and Patrick; and in these the average of condition has declined from 101 in August to 97 in September.

Returns from thirty-eight counties in North Carolina average 101 in September, against 97 in August. Mecklenburgh holds its August estimate of 125, and Edgecombe has advanced from 75 to 100. Twelve reports are below 100. No material loss from insects is reported.

The average condition in South Carolina has fallen from 98 in August to 95 in September. Darlington, Barnwell, Edgefield, and Fairfield Counties, which together produced 90,000 bales of the crop of 1869, average 96, Darlington and Fairfield standing better than in August. Richland, reporting 100 in August, has been visited by the caterpillar, which reduces the estimate to 80.

In August only twelve counties in Georgia, of sixty reporting, returned condition less than 100, and the general average was 104; in September it is replaced at 96. Insect ravages are becoming serious in several counties, especially in Lee, Twiggs, Spalding, Schley, Baldwin, and Marion. In Gwinnett the crop is claimed to be better than ever before; that 10,000 bales are expected, 6,000 being deemed a large crop prior to 1860, this prospect being due to good culture and a liberal use

of fertilizers. Georgia is employing fertilizers more extensively in this culture than any other State.

The decline during the past month in Florida has been from 96 to 92. The caterpillar appeared in Suwannee as early as July 15, and divested of leaves whole fields before August 15. Leon, Jefferson, Madison, Gadsden, and Taylor have also been visited. Floods have swept a large area of bottom-lands, and heavy rains elsewhere have caused leaves and forms to fall.

Only four counties in Alabama made returns below 100 in August, the general average being 107; two-thirds of the present returns are below 100, thirty-two counties averaging 88. Of the prominent counties, Hale shows a decline from 110 to 67, Russell from 103 to 97, and Marengo from 90 to 70. Montgomery indicates an advance from 105 to 110. Two-thirds of the returns include a reference to insect ravages.

The general average of Mississippi returns has fallen since the August report from 112 to 90, Warren has declined from 110 to 108, Madison from 105 to 77, Hinds from 100 to 60. Three-fourths of the returns are below 100. Insect depredations are serious in many counties.

The average for Louisiana was 101 in August; in September 86. In Caddo the decline is from 90 to 50, from 100 to 75 in Concordia, from 95 to 80 in Claiborne; while in Madison, a prominent parish, an advance from 120 to 140 is reported. The caterpillar has been destructive in Tangipahoa, Marion, Red River, Saint Landry, and Concordia. In some counties persistent and comparatively successful efforts were made to destroy the early brood of caterpillars; in Wilkinson large numbers were killed, and in Warren both the caterpillar and boll-worm were held in check by the vigilance and industry of planters.

Drought has shortened the Texas crop, and reduced the average of the returns of condition from 103 to 94. Few reports of the presence of insects are received.

The average of Arkansas returns has been decreased from 96 to 78, mainly by dry weather.

In Tennessee, drought has also been injurious, reducing the average from 104 to 92. The forms and young bolls of the top crop are rapidly falling off, threatening a material reduction of the crop.

In presenting the following extracts from notes accompanying the September returns, it should be remembered that the tables present in compact form the spirit and substance of all the returns received, while the extracts are necessarily desultory and exceptional:

North Carolina.—Crop has rapidly improved within thirty days; just commenced opening, and promises a good yield. *Mecklenburgh:* Best crop since the war; a little rust; too much rain; very heavily bolled. *Onslow:* Never finer in growth, though injured by late rains, causing it to shed forms. *Pasquotank:* Poorer than ever known. *Sampson:* Very seriously affected by rust. *Bertie:* Below average; three weeks ago it was 15 per cent. above; rust has proved very destructive; prospect a third less than it was two weeks ago.

South Carolina.—*York:* Growth remarkably rapid, on some farms too rapid, causing the casting of fruit to a considerable extent. The stock is unusually well grown and filled. Two weeks ago the crop promised 25 per cent. above average, but continuous rains during the latter half of August have caused some rot as well as shedding of young fruit. *Clarendon:* Poorer than for forty-seven years; fine up to July 15, when hot drought set in, cutting down the prospect to two-thirds of an average; fruit has fallen to a great extent; only July cotton left; rust has become general. *Marion:* Early cotton damaged by drought; late cotton by rust. *Richland:* Much injured by rust, and in some localities by caterpillars destroying the whole August crop.

Georgia.—*Glasscock:* Great falling off in cotton; rust and rain have shortened it a half from what was expected a month ago; caterpillars and boll-worms on some farms. *Marion:* almost every field suffering from some disaster—caterpillar, boll-worm, or rust—and, in some cases, all three. Late cotton has no matured fruit, but a rank

growth of weed. Even without the assistance of these scourges the early and late cotton both suffered severely from unusual shedding of bolls, and from extremes of hot and dry weather. *Calhoun:* Injured a third by wet weather and caterpillars. *Columbia:* Crop shortened by overgrowth and casting of fruit. *Lee:* Caterpillar has entirely stripped some fields and threatens to sweep the whole; crop probably 75 per cent. below average. *Floyd:* Caterpillars have just made their appearance, otherwise the crop is very promising. *Twiggs:* Within twenty days a fine prospect of cotton has been reduced 20 per cent. below average. *Fulton:* Best crop ever known, opening finely. *Coweta:* Suffering from caterpillars and blight, besides rust; prospect very gloomy. *Spalding:* Worm and rust doing great damage. *Schley:* Caterpillars sweeping whole fields in forty-eight hours. *Baldwin:* Badly damaged by drought and caterpillars; September cotton will be cut off.

FLORIDA.—*Suwannee:* Caterpillars appeared July 15, and ate up some fields clean by August 15; September 15 the crop will probably be swept; long and short staple cotton will be cut short at least one-half. *Leon:* Caterpillars appeared in force August 18 and by the 25th had stripped cotton of all the leaves, and exposed the fact that there was little or no young fruit, forms, or bolls on the stalks; crop probably not over a third of average. *Jefferson:* Caterpillars and rot have done serious injury to the crop, which probably will not be over half average. *Madison:* The best crop, by far, since the war; caterpillars have not done much damage in this county, as yet. *Gadsden:* Rains heavy and continuous since the last report, making cotton to shed its forms and young bolls, besides causing a great increase of rust, and "black" or "boll" rot. Caterpillars have also done great damage. Late planted cotton will be a failure. *Taylor:* Excessive rains have made the cotton shed its fruit; caterpillars stripped the leaves. Not over a half crop at best; top cotton all lost. Egyptian cotton very fine; but little injured by the caterpillar.

ALABAMA.—*Crenshaw:* Prospects very unfavorable; entire fields denuded of leaves by army-worm, boll-worm, and rust. *Montgomery:* Crop very fine and opening rapidly, but caterpillars are very destructive. *Franklin:* Seriously injured by drought; will probably be not over half crop; half green bolls have fallen off. *Colbert:* Injured by dry hot weather; very few bolls from August growth. *Clarke:* Within ten days the caterpillar has been very destructive; early cotton a half crop; of late cotton many fields usually averaging a bale to the acre will not make over a bale to 10 acres. *Conecuh:* Within ten days the worm has destroyed almost the whole crop. *Russell:* Forward cotton injured by rust; late cotton taken by caterpillars. *Calhoun:* Army-worm within five days has reduced the prospect from average to 25 per cent. below. *Chambers:* Worms doing same mischief. *Butler:* Army-worm doing great mischief; every field bare of leaves. *Macon:* Crops cut short by drought, rust, and worms. *Perry:* Nearly half destroyed by caterpillars. *Dallas:* Caterpillars reduced the crop to nearly 50 per cent. below average. *Pike:* Within ten days army-worms have swept the crop, especially the late planted. *Wilcox:* Freshets and worms have cut down the crops one half. *Tuscaloosa:* Crop greatly reduced by drought and caterpillars. *Limestone:* Cut short a fourth by rust and worms.

MISSISSIPPI.—*Attala:* Fine prospects of the crop existing two weeks ago are seriously compromised by drought and worms. *Pike:* Shortened by drought and army-worm; squares falling. *Lauderdale:* Fine prospects up to August 10, when the drought cut the crop short. Crops of last year 4,000 bales; this year not over 3,000. *Jasper:* Cotton-worm at work. *Newton:* Crop doing well. *Noxubee:* Crop a failure, especially late cotton. *Wayne:* Alarm about caterpillars subsiding; these worms will shorten the crop very considerably. *Coahoma:* Drought has cut down the crop 25 per cent. *Hinds:* Crop half cut off by drought and worms. *Lee:* Reduced 50 per cent. by drought. *Madison:* Prospect reduced a third within a month. *Clark:* Unprecedented falling off of the crop since July 25 through drought and caterpillars; there will be no top crop; the greater portion of the crop will be open in September. *Neshoba:* Yield lighter than last year; drought and worms have seriously shortened it. *Yalabusha:* Has failed rapidly of late through drought, blight, and worms; not over a half crop. *Marion:* Worms have swept the crop; yield not over 65 per cent., at most.

LOUISIANA.—*Morehouse:* Half crop; injured by long drought; quality of staple above average. *Caddo:* Drought has reduced the crop 50 per centum below average. *Franklin:* Ruined. *Madison:* Fine. *East Feliciana:* Crop decreased a third by drought and worms in August. *Iberia:* Bolls and forms shedding freely through drought. *Claiborne:* Blasted by drought. *Tangipahoa:* Fearfully injured by drought; caterpillar taking what is left; perhaps half a crop will be gathered. *Saint Landry:* Probably reduced to a half crop by long drought and army-worms. *Red River:* Shortened 10 per centum during August by drought and army-worms. *Richland:* Reduced to a half crop by drought. *Bossier:* Shortened a half by drought. *Concordia:* Caterpillars have swept many plantations; in many fields not a leaf has been left; damage worse along the river than in the interior. *Rapides:* Stripped of all foliage between 15th and 20th August; cannot yield over one-third of an average.

TEXAS.—*Coryell:* Drought has cut down the crop to a half average. *Kaufman:* Throwing off on account of rain; worms have done a little damage. *Red River:* Suffering for rain. *Dallas:* Will average not over 600 pounds of seed cotton per acre, or 200 pounds of lint; July prospects reduced a third. *Ellis:* Drought shortening the crop again. *Henderson:* Crop ruined by drouth—average not greater than last year—35. *Williamson:* Drought has shortened cotton a third. *Milam:* Upland cotton shortened by drought one third; bottom crops shortened one-fourth; opened prematurely. *Gonzales:* Low condition; drought has caused squares and small bolls to fall; worms have done some damage. *Austin:* Scarcely average owing to drought. *Johnson:* Dry weather shortening cotton crop, yet it will be double of last year's yield. *Fayette:* Drought has cut down the crop at least a third, yet in river-lands crops well cultivated will produce 500 pounds per acre. Caterpillars have been very troublesome; now stripping all the leaves; early prolific seed mostly used. *Waco:* Yield will not pay three-fourths of the cost of production; worst failure yet known here. *Marion:* Crop almost ruined. *Rusk:* Opened to the top; all the squares dropped off on account of drought.

ARKANSAS.—*Monroe:* Drought causing the squares to fall; crop below average. *Crittenden:* Seriously damaged by drought and rust or blight. *Pulaski:* Shortened by drought 33 per cent. *Prairie:* On uplands cut off three-fourths; short also on bottoms. *Drew:* Crop will be short.

TENNESSEE.—*Madison:* Suffering from drought; squares and bolls dropping; rust in a few fields. *McNairy:* Very promising; average considerably increased. *Hardeman:* Seriously injured by drought and heat. *Weakley:* Drought has reduced the crop one-half. *Giles:* Shedding squares and top bolls; will probably be cut short one-fourth.

WHEAT.

The September returns, which give the condition of wheat when harvested, present the following list of States above average: Maine, 109; North Carolina, 109; South Carolina, 102; Georgia, 104; Alabama, 105; Mississippi, 102; Louisiana, 112; Texas, 120; Arkansas, 106; Tennessee, 116; Kentucky, 110; Minnesota, 104; Nebraska, 109. Those below 100 are New Hampshire, 95; Vermont, 91; Massachusetts, 97; Connecticut, 98; New York, 85; New Jersey, 89; Pennsylvania, 76; Delaware, 92; Maryland, 74; Virginia, 99; West Virginia, 96; Ohio, 84; Michigan, 95; Indiana, 97; Illinois, 95; Wisconsin, 98; Missouri, 70; Kansas, 85; Oregon, 96; Iowa, 100.

Reference is made to the tables for August, in which the condition of spring-wheat in that month is shown.

OATS.

Of the New England States, Maine reports the oat crop 8 per cent., and Connecticut 5 per cent. above average, the other States being about 5 per cent. below. In some parts of Vermont and Massachusetts, excessive rains blighted the crop while growing, and injured it in the shock after harvesting. The same causes reduced the crop below an average in all the Middle States. In Indiana County, Pennsylvania, the loss is stated at 20 per cent. In Warren County, New York, the Birlie oats are pronounced inferior in quality to the common black oats, besides being weaker in straw and smaller in quantity, requiring a longer time to ripen. In Virginia, the depreciation is 25 per cent. The Norway oats made a very fine yield in Frederick County. The Schonen is pronounced the best variety ever tried in Highland County, but an entire failure in Accomack. Here, however, the oat crop has failed for the last ten years. In North Carolina, the crop is 7 per cent. above average; but in all the other Atlantic and Gulf coast States it falls from 2 to 24 per cent. below, except in Texas, which reaches 111. In Travis County, a new variety—the red oats—yielded from 75 to 80 bushels per acre. Arkansas, Tennessee, and Kentucky report from 5 to 7 per cent. above average, and West Virginia 3 per cent. below. The crop was injured in the shock in several counties of these States, by rains

North of the Ohio, Illinois reports an average crop, the other States being from 1 to 9 per cent. below. In Lee County, Illinois, the yield will average about 50 bushels per acre. In Champagne County, the injuries of worms in this crop are noted. West of the Mississippi, the crop was from 4 to 14 per cent. above average, except in Iowa—2 per cent. below, where, in many places, it ripened too rapidly. In California, it was 1 per cent. below. Contra Costa County is said never to fail of a fair crop. In Oregon there was a deficiency of 4 per cent.

BARLEY.

The barley crop is quite deficient. East of the Mississippi, the only States that reach an average are Connecticut, North Carolina, South Carolina, and Alabama, in all of which the average is small. Of the Southwestern States, Texas, Tennessee, and Kentucky are above average, as are, also, Minnesota, Kansas, Nebraska, and Oregon. All the other States are deficient.

TOBACCO.

Of twenty-three States reporting the tobacco crop fifteen are full average or above, viz: Connecticut, 108; New York, 106; Pennsylvania, 102; North Carolina, 105; Georgia, 103; Alabama, 101; Arkansas, 105; Mississippi, Louisiana, Texas, West Virginia, and Kentucky, 100; Illinois, 101; Missouri, 103; Nebraska, 107. The remaining eight States are below average, viz: Massachusetts, 99; Virginia, 91; Tennessee, 91; Ohio, 92; Indiana, 98; Wisconsin, 85; Iowa, 96; Kansas, 96. The crop was injured in some localities by heavy rains, and in others by severe drought. In many cases the crop was highly stimulated by quick fertilizers.

GRASS AND PASTURES.

In the New England and Middle States the hay crop was above average, except in New Jersey, where it was 10 per cent., and in Delaware where it was 45 per cent. below. The fine rains of July and August, in many localities, delayed harvest and caused the crop to be gathered in indifferent condition, but brought up the pastures to an unusual high average. In Delaware the remarkable shortness of the crop is attributed to severe drought. In Maryland and Virginia the same cause cut down the yield 38 and 31 per cent., respectively, below average. In Charles County, Maryland, no crop was harvested. From North Carolina to Florida the crop was above average, but westward to the Mississippi several per cent. below. Louisiana reports 14 per cent. and Texas 4 per cent. above average. In Gonzales County the crop was mostly of millet and mesquite grass, a branch of production which shows considerable increase. Arkansas is 11 per cent. above average, while Tennessee is 3 per cent. below, on account of the drought in some counties shortening timothy and red-top. Kentucky is above average. Ohio and Michigan are, respectively, 18 per cent. and 3 per cent. deficient. All the other Western and Pacific States are above average, the excess ranging from 3 to 14 per cent.

POTATOES.

Rust and rot, resulting from excessive rains, reduced the crop in the Northern New England States, through New Hampshire rises to aver-

age. In Massachusetts, on the contrary, the leading complaint is of drought. Rhode Island and Connecticut are above average. All the Middle and Southern Atlantic States are below average, except North Carolina and Georgia. In Delaware and Maryland potatoes suffered from severe drought, reducing this crop in the former 27 per cent., and in the latter 35 per cent., below average. Of the Gulf States, Florida is 6 per cent. and Texas 22 per cent. above average; all the rest are below. Arkansas is full average; Tennessee and Kentucky 6 per cent. above; West Virginia 10 per cent. below. North of the Ohio, Indiana and Illinois are full average or above; the others below; Wisconsin being deficient 20 per cent. West of the Mississippi, all the States are above average, except Nebraska, which is 2 per cent. below. California is 7 per cent. below, and Oregon 6 per cent. above.

Sweet potatoes.—With the exception of North Carolina, which is about average, the Middle, Southern, and Southwestern States report deficiencies ranging from 1 to 32 per cent. North of Ohio, Indiana is the only State that rises to average. Missouri and Kansas are full average or above, while all the other Western and the Pacific States are below.

FRUITS.

Apples.—The apple-crop of New England ranges from average to 33 per cent. above. In every one of these States the September returns show an improvement over those of August, except in Rhode Island, where the crop about held its own. Our correspondent in Newport, Rhode Island, says that the apple-crop of that region has grown very precarious of late years; crops of ten years together do not now equal what was considered a good crop thirty or forty years ago. In Norfolk County, Massachusetts, cider-apples are so abundant as to sell at 10 and 15 cents per bushel. In Windham County, Connecticut, the canker-worm (*Anysopteryx vernata*) was troublesome in a few orchards.

In New York the apple-crop rose, during August, from 2 per cent. below average to 6 per cent. above. Complaints of falling from the trees were mentioned in the August returns, in several counties. In New Jersey the crop slightly improved during August, reaching 22 per cent. above average. In Gloucester and Morris Counties the fruit is reported as especially fine. In Pennsylvania the crop, during August, rose from 15 per cent. to 24 per cent. above average. In Berks County the market was overstocked, and thousands of bushels left to rot upon the trees. Several counties report crops exceeding any former ones. In Delaware the crop was not only excellent, but it appears to have improved during August. The August returns represented it 50 per cent., and the September returns as 75 per cent., above average.

In Maryland the crop is reported at 19 per cent. above average, with a considerable improvement during the previous month. This abundance appears to be general throughout the State. In Virginia it rose nearly to a general average, though shortened by drought in some localities. In North Carolina it was abundant and generally good. In one or two counties late frosts were quite destructive. In South Carolina it was not over two-thirds of an average in quality, and generally inferior. Georgia reports an inferior crop, declining during August, though in some localities the fruit was unusually fine and well flavored. In Florida it was comparatively a failure, and in Alabama and Mississippi considerably below average. The rot was quite severe in many places. In Louisiana and Texas the general yield was satisfactory, though in some places the fruit was imperfectly developed and fell prematurely from the

trees. In Bexar County, Texas, it was remarked that young apple-trees yielded astonishingly.

The crop ranged from 4 per cent to 15 per cent. above average in Arkansas, Tennessee, West Virginia, and Kentucky. In some places the fruit rotted considerably and fell from the trees, but in other localities the crops exceeded those of any former year.

The yield was about average in Ohio, Indiana, and Illinois. In some counties the trees were loaded with fine fruit, especially in orchards that failed of a crop last year. In Bureau County, Illinois, the fruit sold at $1 per barrel, and in Warren County, Ohio, as low as 40 cents per barrel. The crop of Michigan was reduced by drought 5 per cent. below average, and in some localities the keeping qualities of the fruit considerably depreciated. In Wisconsin the yield is reported 23 per per cent. below average. West of the Mississippi the crop amounted to about an average, Nebraska declining from 15 per cent. to 3 per cent. above during the month of August. In these States apple-culture is in a comparatively infantile condition, but gives promise of great results hereafter. On the Pacific coast the yield is quite inferior, having been cut short by spring frosts.

Peaches.—Peach-culture is not of sufficient importance in Northern New England to attract much notice from our correspondents, yet in New Hampshire the crop is 15 per cent. above average, with a decided improvement during August. In Rhode Island it is noticed that peaches, like apples, are becoming quite precarious. In Connecticut the crop is below average, having declined during August. In Massachusetts the few peach-trees that escaped the severe freezing of last winter were loaded with fruit.

In New York the crop rose during August to 9 per cent., and in New Jersey to 10 per cent., above average. In Morris County, New Jersey, Hale's Early ripened early, but was inclined to rot. Pennsylvania was about average. The crop of Delaware was reduced, in July, one-half, and in August two-thirds, by the extreme drought. In all the South Atlantic and Gulf coast States the crop was quite inferior, except in North Carolina, where it was 5 per cent. above average, and in Texas, where it was about average. Several counties, however, presented marked exceptions, the fruit being unusually fine and abundant. In some counties of Louisiana the ravages of insects are noted. Arkansas and Kentucky are considerably below average, while West Virginia reports but little over a half crop. Tennessee is about average in spite of injuries to early fruit by excessive rains in some counties.

Ohio and Michigan report less than a half crop, complaints of winter-killing being numerous, while Indiana is 5 per cent. and Illinois 15 per cent. above average. In Saint Clair County, Illinois, the crop was so abundant as to lose almost all marketable value. In Wisconsin and Minnesota peach-culture is not sufficiently important to attract attention. In the other States west of the Mississippi River the reports are highly satisfactory, showing a condition of the crop ranging from 6 per cent. to 33 per cent. above average. In California and Oregon there will be less than three-quarters of a crop. The crop of the Pacific coast, however, will, in coming years, be greatly increased by the yield of large numbers of young trees lately planted.

Grapes.—The grape crop of the New England and Middle States is below average, except in Rhode Island, where it is 5 per cent. above, and in Delaware, where it is a full average. In most of these States the reports show a decline during August. The South Atlantic and Gulf States are full average or above, the Scuppernong enjoying its usual

prominence. In a few localities excessive rains have developed a tendency to rot and mildew, but the general condition of the crop appears to be quite satisfactory. In Louisiana insects were troublesome in some cases. Arkansas is considerably below average. In Bradley County the Iona and Delaware rotted badly, but the Concord, Allen, and Rogers hybrids did well. The Scuppernong never fails in that region. Tennessee and Kentucky are above average, but West Virginia falls 3 per cent. below. In Randolph County Concords were excellent, but Isabellas rotted badly. In Ohio and Michigan the crop is deficient, but in the other States north of the Ohio River it is considerably better than usual. In Knox County, Illinois, Concords, Clintons, and Delawares fruited well; Rogers hybrids were largely winter-killed. West of the Mississippi the crop was above average, except in Minnesota, 3 per cent. below. In Muscatine County, Iowa, it is reported as enormous. In New Mexico complaints are received of injuries to the crop by hail and flies. In California the crop was reduced 13 per cent. below average. Sun-scald, mildew, drought, and foggy weather are mentioned among the causes of the decline. In El Dorado County foreign grapes were a full average, being somewhat better than native varieties. Oregon reports full crops.

Miscellaneous.—Pears were remarkably fine in Middlesex County, Connecticut, and King George County, Virginia. In Lee County, Mississippi, Duchesse pears rotted considerably. In Jefferson County, Kentucky, pears were much injured by insects. Pear culture has been commenced in Washington County, Nebraska, with very good prospects. Strawberry culture was remarkably successful in Somerset County, Maine, Hillsborough County, New Hampshire, Steuben County, New York, and Santa Fé County, New Mexico. In Manatee County, Florida, guavas were reported as plentiful, and ripening fast. Oranges were expected to be fit for shipment by the middle of September. Bananas were better than for three years. Encouraging reports of the orange crop also come from one or two counties in Louisiana.

Table showing the condition of the crops, &c., on the 1st day of September, 1872.

STATES.	Corn. Average condition Sept. 1.	Wheat. Average condition when harvested.	Rye. Average condition when harvested.	Oats. Average condition when harvested.	Barley. Average condition when harvested.	Buckwheat. Average condition September 1.	Potatoes, (Solanum tuberosum.) Average condition September 1.	Potatoes, (Batatas edulis, sweet.) Average condition September 1.	Tobacco. Average condition Sept. 1.	Cotton. Average condition Sept. 1.	HAY. Product of timothy compared with last year.	HAY. Average condition of timothy when harvested.	HAY. Product of hay of all kinds compared with last year.	Beans. Average condition Sept. 1.	Sorghum. Average condition Sept. 1.	Sugar-cane, (not sorghum.) Average condition Sept. 1.	HOPS. Acreage compared with last year.	HOPS. Average condition Sept. 1.	STOCK HOGS. Number for fattening compared with last year.	Average condition as to weight and size.	Wool. Weight of fleece compared with an average clip.	Apples. Average condition Sept. 1.	Peaches. Products compared with an average.	Grapes. Average condition Sept. 1.
Maine	107	109	104	108	97	102	88	.....	....	....	143	110	152	101	....	.....	88	110	97	101	97	108	.....	89
N. Hampshire	106	95	99	95	95	95	100	.....	....	....	119	105	125	102	....	.....	100	93	95	103	101	122	115	90
Vermont	102	91	99	96	94	106	92	.....	....	....	118	93	128	89	....	.....	91	106	95	102	101	100	.....	93
Massachusetts	105	97	97	96	95	97	99	.....	99	....	98	105	102	97	....	.....	.....	....	100	102	93	133	77	94
Rhode Island	105	.....	100	95	95	.....	102	.....	....	....	100	100	100	95	....	.....	.....	....	100	100	105	100	100	105
Connecticut	107	98	99	105	102	102	102	.....	108	....	104	96	104	100	....	.....	.....	....	95	99	101	131	96	78
New York	110	85	95	99	95	97	98	.....	106	....	98	95	103	98	....	.....	95	99	96	100	101	106	107	88
New Jersey	110	89	93	86	.....	101	85	90	....	....	96	90	90	96	....	.....	100	100	98	102	100	122	110	84
Pennsylvania	109	76	91	92	92	105	96	96	102	....	102	95	101	98	92	.....	98	103	98	101	100	124	99	91
Delaware	57	92	....	86	.....	90	73	68	....	....	57	50	55	75	62	.....	.....	....	100	100	100	175	30	100
Maryland	86	74	82	69	73	86	65	81	.....	....	60	84	62	99	83	.....	.....	....	101	103	102	119	92	118
Virginia	95	99	95	75	.....	95	85	89	91	97	67	78	69	88	93	.....	.....	....	100	98	99	98	89	107
North Carolina	112	109	104	107	100	96	103	101	105	101	103	101	109	103	93	.....	.....	....	100	103	100	109	105	105
South Carolina	106	102	94	76	100	.....	89	93	....	95	.....	.....	111	101	107	100	.....	....	97	97	100	95	97	104
Georgia	108	104	96	87	99	100	100	98	103	96	90	85	106	106	101	91	.....	....	99	100	97	91	89	99
Florida	92	.....	82	98	.....	.....	106	99	....	92	.....	.....	100	....	....	104	.....	....	105	96	98	....	83	100
Alabama	107	105	92	93	100	.....	91	96	101	88	83	88	98	88	99	100	.....	....	109	105	100	92	87	109
Mississippi	113	102	100	88	.....	.....	95	97	100	90	.....	.....	96	98	98	99	.....	....	101	101	100	84	73	100
Louisiana	120	112	....	97	.....	.....	96	95	100	86	.....	.....	114	120	....	104	.....	....	92	100	103	82	83	100
Texas	115	120	111	111	106	.....	122	86	100	94	110	110	104	105	102	98	.....	....	96	100	105	99	100	109
Arkansas	100	106	....	105	.....	.....	101	94	105	78	101	103	111	87	97	.....	.....	....	107	96	97	96	84	86
Tennessee	105	116	105	106	102	108	106	98	91	92	99	99	97	102	99	.....	.....	....	97	100	99	104	101	112
West Virginia	100	96	94	97	88	97	90	94	100	....	87	91	87	97	95	.....	97	95	104	99	100	100	57	97
Kentucky	115	110	105	105	105	94	106	99	100	....	100	96	101	103	101	.....	.....	....	104	103	101	115	87	105
Ohio	108	84	94	91	90	93	91	92	92	....	82	90	82	99	98	.....	100	99	101	102	100	101	47	89
Michigan	99	95	99	92	96	99	81	88	.....	....	98	99	97	99	92	.....	103	101	101	101	101	95	49	87
Indiana	105	97	99	99	93	94	100	101	98	....	99	97	100	97	97	.....	90	102	103	103	101	102	105	107
Illinois	107	95	99	100	95	96	105	99	101	....	105	98	103	97	98	.....	.....	....	100	101	102	99	115	104
Wisconsin	98	98	101	92	99	92	80	.....	85	....	102	102	107	91	105	.....	102	111	103	101	102	77	.....	109
Minnesota	98	104	103	104	103	104	113	.....	.....	....	107	105	105	99	96	.....	96	101	96	101	102	106	.....	97
Iowa	104	100	99	98	99	99	103	96	96	....	98	97	104	102	99	.....	93	94	102	102	106	98	106	102
Missouri	110	70	85	108	90	103	105	100	103	105	112	101	114	95	97	.....	.....	....	104	103	100	93	110	101
Kansas	112	85	101	111	100	102	101	101	96	....	112	96	102	99	98	.....	.....	....	121	108	102	102	133	107
Nebraska	111	109	108	114	108	110	98	107	107	....	110	107	111	115	105	.....	.....	....	120	108	95	103	128	112
California	103	.....	106	99	97	98	93	92	.....	....	96	105	104	101	....	.....	147	112	101	100	100	82	73	87
Oregon	101	96	100	96	100	.....	106	.....	.....	....	98	99	103	105	....	.....	.....	....	90	95	103	95	69	100

Table showing the condition of the crops, &c., on the 1st day of August, 1872.

STATES.	Corn. Average condition August 1.	Spring-wheat. Average condition August 1.	Spring-rye. Average condition August 1.	Oats. Average condition August 1.	Barley. Average condition August 1.	BUCKWHEAT.		Potatoes, (Solanum tuberosum.) Average condition August 1.	Potatoes, (Batatas edulis, sweet.) Average condition August 1.	Tobacco. Average condition August 1.	HAY.			Pasture. Average condition August 1.	Beans. Average condition August 1.	Cotton. Average condition August 1.	Sorghum. Average condition August 1.	Sugar-cane, (not sorghum.) Average condition August 1.	Apples. Average condition August 1.	Peaches. Average condition August 1.	Grapes. Average condition August 1.
						Acreage compared with last year.	Average condition August 1.				Average condition of timothy Aug. 1.	Product of clover compared with last year.	Average condition of clover when harvested.								
Maine	110	108	105	108	104	104	105	106			101	123	103	115	105				105		100
N. Hampshire	103	102	99	100	100	102	102	100			101	121	105	110	102				107	103	95
Vermont	101	106	104	110	101	97	101	102			111	115	101	111	103				90		95
Massachusetts	104	98	98	100	100	98	100	105		93	93	87	91	105	100				110	86	93
Rhode Island	100		100	102	98			101			96	100	101	96	102				101	96	103
Connecticut	110			100	105	96	97	101		91	96	108	97	109	101				115	103	88
New York	107	101	102	106	105	100	102	105		102	97	96	97	105	102				99	98	99
New Jersey	103			82		97	100	90	88		89	82	89	98					120	102	99
Pennsylvania	104	97	92	98	95	107	103	101	99	98	88	92	90	98	100				115	101	96
Delaware	96			85		102	100	72	70		46	46	46	50	67		57		150	51	110
Maryland	84			64	75	101	85	85	87	86	56	60	79	54	75		80		108	77	104
Virginia	92			73		93	99	87	87	88	67	72	83	79	89	101	90		93	82	107
North Carolina	106			103		86	98	102	102	100	105	104	98	102	102	99	96		105	97	102
South Carolina	98			70				88	86			111	103	98	90	98	100		88	87	111
Georgia	105			90	102	101	97	95	97	96	95	105	98	101	101	104	101	99	94	90	100
Florida	84			82				82	95	92				100	77	96		99	65	70	103
Alabama	108			95	100			93	101	98	93	98	97	108	100	107	98	101	92	91	99
Mississippi	116			86				100	101	104	98	105	102	109	100	112	105	100	93	79	106
Louisiana	118			101				96	110	100				130	77	101		94	105	81	96
Texas	112			112	116			112	98	101	106			100	93	103	105	100	104	98	101
Arkansas	103			112				117	107	109	101	106	106	111	105	96	101		118	102	94
Tennessee	108			102	94	113	102	109	103	103	97	99	99	106	101	104	104		108	102	107
West Virginia	104			99	95	100	100	101	97	98	86	87	94	97	99		95		102	62	97
Kentucky	114			100	101	104	107	111	100	101	95	101	99	110	104		100		111	98	102
Ohio	101	89	98	91	90	103	98	99	96	90	80	86	93	95	98		97		97	30	84
Michigan	96	96	97	93	98	96	93	92				94	102	85	99		100		92	70	91
Indiana	103	91	100	103	90	98	101	111	99	99	91	97	98	102	101		98		97	95	103
Illinois	106	99	97	98	96	97	97	107	104	101	96	98	100	104	100		98		97	112	109
Wisconsin	94	95	101	97	95	94	94	90		96	105	117	104	94	103				70		104
Minnesota	94	109	102	111	106	99	101	111			105	95	95	110	103		94		99		92
Iowa	100	100	105	105	100	102	101	104	97	97	93	97	100	102	100		96		99	100	105
Missouri	110	85		108	99	113	105	110	105	99	102	101	102	113	101	102	99		98	120	106
Kansas	114	96	91	105	97	120	100	109	102	92	97	108	97	103	100		99		99	111	107
Nebraska	116	112		113	110	99	101	98	95		95	109		111	111		104		115	120	122
California	106	95	113	95	92	140	90	98	94		92	105	106	98	108				87	79	94
Oregon	99	92	88	94	92	100	96	91			90	89	96	93	102				74	80	93

EXTRACTS FROM CASUAL CORRESPONDENTS.

STOCK-BREEDING.

Shenandoah, Virginia.—I have now been in the business of breeding and raising pure Short Horn cattle for twenty-five years, and am firm in the belief that they are, as a breed, far superior to, and much more profitable to handle than our common stock. To demonstrate this, I give a statement of the sales of 26 head of cattle, raised before the war, when beef commanded ordinary prices. The calves were fed on bran and hay the first winter, on hay, fodder, and straw the second and third, and grazed well during the summers. They were fattened on twenty-two bushels of corn each, weighing, at an average age of three years eleven months and a half, from 1,500 to 1,985 pounds; nine of them bringing $91.11, fifteen, $100, and two, $106, per head, or an average of $97.38 each. From my observation I think these prices are at least 30 per cent. better than could have been obtained for any common stock ever raised or fattened in this section of the country.

STOCK-RAISING.

Granger, Texas.—We are now undergoing quite a revolution in the way of stock-raising. Heretofore the ease and cheapness with which cattle have been raised, roaming at large upon our vast prairies, have prevented our people from any extra labor or outlay that might be necessary to improve their stocks of cattle. But within the past two years the grass upon the prairies, from over-stocking, has deteriorated so much in quality and quantity that our nomadic system must give way to a more profitable mode of stock-raising. Still, such is the expense of importing stock, owing to our interior situation, and the risk attending the same from casualties on the route and acclimation after arrival, that importations on an extensive scale cannot be expected for some time. However, a few enterprising citizens are giving the subject especial attention, and we hope in a few years to have native-born breeders from imported stock, to which time we anxiously look as the dawning of a new era in the history of our country.

Experience teaches me that, with proper attention, no country is better adapted to sheep-raising than this, though our people have been greatly discouraged, from the fact that whole flocks sometimes die out in a few weeks, but the cause is emaciation, superinduced by the disease known as the scab, and the practice of indefinitely increasing the size of flocks, and not providing for them in winter.

We have lately received most valuable acquisitions to our hog-stock by the introduction of thorough-bred Chester White, Berkshire, Poland, China, Neapolitan, and Essex. Much attention is now being paid to this stock.

Our county boasts some dozen or more thorough-bred stallions, besides numbers of brood-mares. Altogether, I think our prospects for rapid improvement in stock-raising are quite flattering.

Edgefield, South Carolina.—My land is adapted to the culture of cotton, and only about half enough corn is produced for home consumption, all long forage being carefully husbanded for work-stock. Cattle are not fed through winter at all, and I could have a marketable beef at any time from my small herd without making much choice.

After the cattle pick over our corn-fields in the fall they are turned into the cotton-fields, (the crop having been gathered,) the tender limbs and immature bolls affording excellent winter pasturage for awhile; after which the small winter undergrowth among the broom-grass in the old fields keeps them in fair condition until the spring pasturage is ready. It is my experience that cattle, if not fed regularly, do better not fed at all through the winter. On my farm, of about 600 acres, half of it turned out and spontaneously set with a species of wild clover and broom-grass, I could winter 40 head of cattle.

Nemaha, Nebraska.—The amount of stock of all kinds is rapidly increasing, owing mainly to the passage of a herd-law.

CATTLE-DISEASE.

East Baton Rouge, Louisiana.—Some few cattle have died during the past summer; supposed to have been poisoned in browsing, or drinking stagnant and impure water. Nothing is known positively as to the real cause, nature, or treatment of said disease. I examined two cases that resulted fatally some five or six days after the attack. The symptoms were general lassitude, a drawn up or contracted body, loss of appetite, and obstinate constipation. The only lesions discoverable after death were softening and an easy separature of the mucous lining of the stomach proper. Long-digested and half-digested food were impacted and pressed in between the folds, rather dry; and the mucous coat separated and peeled off upon the slightest effort. No ulceration anywhere discoverable. The feces in the bowels natural and rather dry.

DISEASE AMONG HORSES.

Lee, Iowa.—There is a fearful disease here among horses. Veterinarians say it is congestion of the small blood-vessels. It sometimes commences in the limbs and sometimes in the head. It is something like erysipelas. If not attended to when the horse is first taken it will soon terminate fatally. We had a very fine horse die with it. It commenced in her limbs, which began to swell, and appeared stiff; it extended to her head, throat, and lungs. The throat swelled dreadfully. We poulticed with may-weed until the swelling went down, but it broke inside.

COTTON IN CALIFORNIA.

Sonoma, July 20, 1872.—The cultivation of cotton, which has already proved a success in Merced and other central counties in this State, is attracting the attention of the more progressive of our own farmers. Accordingly, this year, the experiment of raising it here has been undertaken by Messrs. Miller & Nealy in Dry Creek Valley. The plants at this time look thrifty, being full three feet high, with promises of an abundant crop. Other parties have also engaged in its cultivation. Should the soil and climate of this county be found favorable to its production, there is no doubt that it will, ere long, be very extensively cultivated. Successive cultivation of wheat for years has very much impoverished the soil. Our farmers must seek some other crops, or ruin their lands. Cotton may fill this want; and, if so, Sonoma County, with its genial climate, and rich, productive soil, may soon help to restore king cotton to his throne.

CONDITION OF COTTON IN SOUTHERN MISSISSIPPI.

Brookville, Noxubee County, Mississippi, August 29, 1872.—The cotton crop I regard as a failure, resulting from various causes. One-third of the crop of this county was planted very late, and, owing to the long dry spell, did not come up in time to make a good yield. This late planting is now being discovered by that pest the army-worm. This young cotton, which, a few days ago, promised a large yield, say from 800 to 1,000 pounds per acre, will not make on the average 200 pounds seed-cotton. I do not regard a single bloom that has appeared within the last fifteen days, or that shall hereafter appear, as of any account. Nearly all the young bolls have dropped, or are now being destroyed by the worm stripping the young bolls of the cup surrounding them, and thus stopping their growth. The rust has taken possession of all the poor upland cotton, being now dry as stubble. Last week, in visiting Columbus, I saw considerable sandy land, and did not see an acre that would produce 300 pounds; many acres will not yield 200 pounds. This same land last year made from 800 to 1,000 pounds seed-cotton. I am safe in saying that the crop, not only of this, but also of Lowndes County, and Pickens County, Alabama, has fallen off at least 50 per cent. within the last twenty days. To make a large yield, we should have bloom until September 10, but this year very little bloom after August 10 will make cotton. The three counties, Noxubee, Lowndes, and Pickens, Alabama, will not make as much as they did last year. If the general crop is no better than in these three counties, it cannot reach 3,000,000 bales. Our labor is doing finely—gathering the crop rapidly. Nearly the entire crop will be open in a few weeks, as the sun can directly reach the bolls, since in a few days more all the leaves will be destroyed by the worms.

POISONOUS PASTURAGE.

Columbia, Florida.—There is a belt of land, some two or three miles wide by ten or twelve long, upon which no cattle can be raised, an occasional case excepted. They are attacked with *flux* or *scours*, which reduces them very fast, and soon causes their death. It is called by the old herdsmen here, "pond disease," but the few cypress ponds are hardly sufficient to account for it, since we find similar ponds where the cattle are quite healthy. Some residents of the section have not raised more than a cow or two in ten years, but have lost a great many bought and taken there. Cattle grazing upon it for a week or two are rendered almost incurable. Frequent salting and bleeding by cutting ears and tail, are the principal remedies resorted to, and in bad cases they avail very little. Some think it is caused by eating certain vegetables; thers by the dews; while others assert that cattle may feed on the affected belt hrough the day and remain healthy if driven off at night. There has been some fever mong our cattle, doubtless originating from grazing on overflowed lands, which has en done in many localities since the excessive rains of August and September last. It was confined mostly to young cattle, about 10 per cent. of which died.

CALIFORNIA CLOVER.

Victoria, Texas.—The California clover is doing finely. It is at present about 16 inches high. The burs or seed-pods are produced at every joint, the joints being about 1½ inches apart. At each of these there springs up a flower-stalk half an inch in length, terminating in a cluster of small yellow flowers, from four to six in number, from which the burs are formed. These runners or stems grow to three or four feet in length, putting out laterals, jointed like the main stock, and filled with seed-pods which cover the surface of the ground from one to three inches deep, and of which both fowls and animals are exceedingly fond.

JAPAN CLOVER.

Elmore, Alabama.—Thousands of acres have remained unfenced here since the war, and many farms have been abandoned. The lands have grown up in pine, and most of them are now covered with wild clover, (*Lespedesa striata,*) on which cattle and sheep browse daily, and get seal fat; even our horses and mules fatten quickly on it. I know some regard it as worthless, but this is a mistake; it is far superior to our native grass. The red and white clover are both doing well here on small patches.

FARMING IN KANSAS.

Atchison County.—I have traveled through fourteen States and Territories west of Pennsylvania, and this is the best "lazy man's country" I have found. Our pastures are the unbroken prairie, upon which stock runs at large seven or eight months in the year, and from which their supply of winter food can be drawn by simply cutting and stacking the native grass. Corn grows with but little work, one hand attending from 40 to 60 acres with a sulky-plow, on land only half broken up in the spring, and planted with a horse-planter. Some land which has been planted in corn for the last sixteen years still averages from 30 to 70 bushels of shelled corn per acre.

ALKALI SOIL FOR CORN.

Los Angelos, California.—We think here that it is owing to the presence of this alkali, (which abounds here,) more than to any other reason, that corn produces from 50 to 140 bushels of shelled corn to the acre, with almost no cultivation after planting. Would this alkali added to other soils make them produce greater crops of corn?

A FRUITFUL PROSPECT.

Lee, Mississippi.—The declaration of all men is that they never saw, at this season of the year, so good a prospect for fine crops in this county, and the cultivation has been better than ever before. The freedmen are working better than formerly.

BENEFIT OF MUCK AND LIME ON SANDY SOIL.

Ocean, New Jersey.—There is nothing like muck for our sandy lands, a liberal use of which, having previously prepared with lime, will produce most satisfactory results. It holds the moisture when nothing else will. Our poorest land can be made to bloom like a garden.

A FRUITFUL COUNTRY.

Stanislaus, California.—The wheat and barley, the staples of our county, have been harvested, and thrashing is going on rapidly. I have counted thirteen thrashers and separators in operation all in sight. I have visited forty-seven, and find the yield to be over 14 bushels to the acre on the average. From my own observation, and that of my assistants, I place the product of this county at 2,500,000 bushels of wheat, and 300,000 of barley. Our thrasher and separator has been at work twenty-four days with 18 horses and 13 men; has thrashed 24,800 bushels of grain, mostly wheat.

INFLUENCE OF DROUGHT ON THE SOIL.

Hawkins, Tennessee.—Our wheat crop is the best we have had for fifteen years, both white and red. The dry weather of last summer, that ruined our corn crop, seemed to put the land in good condition, so that the best crops were made where corn had been grown the year before.

HOPS.

De Kalb, Illinois.—Hop-yards are becoming quite numerous; the cultivation of the hop is engaging the attention of many. It is found that it is quite at home on the prairie soil; indeed, it grows spontaneously in all the river and creek bottoms, maturing well each year, with few or no parasites.

BROOM-CORN.

Douglas, Illinois.—Broom-corn is quite a product in this county; will produce a full average crop.

ECCENTRIC SEASON.

San Pete, Utah.—The season has changed this year from what it has been since this county was settled. We have had thunder-storms every few days, and some of them extra storms. On the 4th of June a thunder and hail storm passed over Fayette. Hail-stones as big as marbles cut down the garden-truck, cut the fruit off the trees by the bushel; also cut off the young shoots and the bark, almost to their destruction. Hail-stones formed drifts in some places two or three feet deep. On the 24th of June we had another thunder-storm which brought down the water in a solid sheet; it did not stop to rain, but came at once in rivers and took all before it. On the 30th we had a snow-storm which clothed the mountains with a white mantle, but soon disappeared, followed by a slight frost.

METEOROLOGICAL CHANGES.

King George, Virginia.—The rains of August have fluctuated greatly in the last twenty-odd years. In 1867 they amounted to 10.795 inches; 1866, 1.17 inches; 1869, 0.61 inch; 1870, 0.81 inch. These three are the least in twenty-three years. Those of the late August were 1.805 inches.

Holt, Missouri.—We are having so much rain that I fear fully one-half of our wheat will be destroyed by mold or sprouting. When it is not raining the air is so damp that it does not dry. A salt-cellar filled with salt, in twenty-four hours becomes nearly all water, and this dampness has continued for a month. I cannot but believe that the cultivation of the soil and growing of trees north, west, and south of us, where millions of acres have lately been broken up, have affected our climate. Until five years ago it was remarkable for its aridity; since then the moisture has regularly increased, till this year it has become ruinous. Up to the 10th of last April eleven millions of trees had been planted in Nebraska, and millions had been planted in the years before this. We are at the very point to be influenced by this, if any point is; for the clouds formed in Nebraska and Kansas float over us. Certainly our climate is not as it was eighteen years ago.

EUCALYPTUS AND OTHER PLANTS.

Galveston, Texas.—I report progress with seeds of Australian trees received from the Department of Agriculture January 17, 1872, and planted the same date. The eucalyptus or gum-tree has grown in six months, from January 17 to July 17, to the height of 33 inches. Other varieties of the eucalyptus, in the same time, have grown from 12 to 22 inches. The casuarina or beef-wood tree—the native oak of Australia—has grown about 24 inches. I divided the seeds with others, and have received from them reports of success fully equal to mine. The eucalyptus is certainly the most rapid-growing tree I have ever seen.

GRAPES AND WINE.

Lowndes, Georgia.—We have in this county about 32 acres planted with Scuppernong grape, increasing every year, all started since the war. There is a fine opening here for persons wishing to go into wine-making; young vineyards can be bought cheap. Our people are all poor; we want and invite immigrants; land is from $2 to $10 per acre.

Pulaski, Missouri.—There were but few grape-vines in this county before last spring. Then, in this immediate vicinity, some eight or nine acres of vines were planted, and they are growing finely. We have organized a grape and fruit-growers' association.

SUGAR-BEETS IN CALIFORNIA.

Sacramento.—The culture of sugar-beets is attracting much attention in this locality. There are about 1,200 acres now growing, within five miles of Sacramento, along the American River, which promise a heavy yield. The Sacramento Beet-Sugar Company will soon commence working them up.

FULTZ WHEAT.

Buncombe, North Carolina.—The Fultz wheat sent me, put in by different persons and on different kinds of soil, looks very well on strong, deep, stiff, mulatto soil, and, if manured, on gravelly, gray soil. Other varieties of wheat are considerably winter-killed on loose, open, porous soil.

Greenville, South Carolina.—One of the grains of the Fultz wheat, sent me last year by the Department of Agriculture, produced fifty-six stalks, averaging 3 feet high; size of leaf 1 foot long by ¾ inch wide. Each head contains 30 grains, an increase of 1,680 fold. It has no rust, and is now so far developed that it is independent of any drawbacks from fluctuations of weather. It looks fair and beautiful, a proof that it is in the right belt of earth and climate.

LINCOLN WHEAT.

Jasper, Iowa.—I send you a sample of wheat grown here the last two years, by the name of Lincoln wheat, a bearded variety. It is the hardiest, most productive, and in every respect the best wheat I have ever seen. It should be well distributed through the States that grow spring-wheat. It is neither early nor late in maturing.

ROTATION IN CROPS.

Greenville, South Carolina.—Ninety-nine times in a hundred, wheat planted here by the 10th of October will yield a good crop by the 10th of June. Clover-seed, rolled in at the same time with the wheat, will give a crop of "stubble-hay" after the wheat comes off, better for cattle than corn-fodder. If the land is good, the clover, which stands three years, will yield a larger profit in hay than any other crop. Then clover-sod, plowed in and put to corn, will give 30 bushels to the acre. Then, with six wagon-loads of barn-yard manure to the acre, plowed in, it will yield a wheat crop of from 12 to 15 bushels per acre. Then let the field stand in clover and rest for three years again.

DISASTROUS FLOODS.

Greene, Missouri.—An abundant harvest is generally promised, though in some sections there have been disastrous floods, completely ruining bottom-farms, washing the soil entirely away, and leaving beds of gravel in its place. In some instances the first intimation of danger would be the noise of the flood coming down the valley, which was described as a wall of water, 6 feet high, reaching from bluff to bluff. Eye-witnesses say that two dense clouds came from opposite quarters of the heavens, and that when they met a perfect deluge followed. Several lives were lost.

Ada County, Idaho Territory.—The unusually high waters in the Boise and Payette Rivers, upon which are situated most of the cultivated lands of the county, have seriously damaged the grain crop, though it is hoped that the injury will be found to be less than at present reported—some estimating it at one-fourth of the entire crop. The waters are now subsiding rapidly.

THE MINNESOTA STATE FAIR.

The annual fair of the Minnesota State Agricultural Society was held at St. Paul on the 17th, 18th, 19th, and 20th of September. An address was delivered on the third day of the fair by the Commissioner of Agriculture, the greater part of which is herewith presented:

FARMERS AND CITIZENS OF MINNESOTA: In passing through your most interesting State, viewing your splendidly built cities and towns and lovely farms, it requires a thoughtful imagination to realize the truth that, as a State, you had no existence five and twenty years ago. It seems as if enchantment had lent its powers of creation, or that all these extensive works had been spoken into existence by a miraculous agency. But things around teach us otherwise, and we recur to the prodigious enterprise of the American people; and when we look into the philosophy of that, our amazement is subdued by the vastness of the field in which we live. The minds of men expand or contract with the objects which surround them. But I came not here to philosophize, but to commune with an agricultural people on a subject which peculiarily belongs to them. As the curiosities of literature attract the attention of the philosopher, so do those natural curiosities which grow out of the consideration of the mouths and lungs of the earth, the development and growth of plants, their life and death, their products and their uses, attract the attention of farmers. There is no occupation of life to which the teachings of science are so applicable as that of agriculture, and no teaching so useless and deceptive when unaccompanied by practical experience.

You are an agricultural people; the statistics of your State, so wisely and carefully collected and published, evince the great interest you take in this subject. For more than forty years have I been engaged in conducting the operations of a farm, not so much with the view of pecuniary profit as for the indulgence of an ardent fondness for the study of the mysteries of the art of farming. I will be indulged, therefore, in the discussion of a subject so familiar to you.

The first and great leading idea which presents itself with regard to the management of a farm is rotation of crops. Wheat is the great staple commodity of your State; and while the genial nature of your soil, the delightful character of your summers, and the natural instincts of reason forbid the cultivation of this grain alone, I fear you are prone to forget that there are certain and fixed principles, dictated by natural laws, over which you have no control, which must be observed in the course of farming. It is not worth while to inquire into the mysterious influence which the growth of one plant exerts upon the production of that which succeeds it; it is enough that we do know and to some extent act upon the knowledge that a rotation from one crop to another is essential to the successful growth of any. It is a fact within the knowledge of every observing man that the average product per acre of wheat everywhere throughout the United States has diminished in quantity, and that the grain itself has degenerated in quality. Acquired knowledge of the science of agriculture, improved skill in the use of that knowledge, and greater experience in the application of both—the ingenuity of the mechanic coming to our aid to supply us with such implements as almost supersede the drudgery of labor—notwithstanding all these, wheat, the great leading crop of the country, has fallen off. Why is this, in a period when the same efforts of science and industry in England have increased their crop nearly five bushels to the acre? It is because, while they not only study to know what

crops and what rotation of those crops are best adapted to their soil, they pursue that rotation with a determination of purpose with which no accident or exigency is allowed to interfere. While the growth of the various root crops enters largely into their system of cultivation, it is because experience has taught them that it is an essential item in a proper course of rotation and conduces to the growth of wheat. Now, while the root crop may or may not be congenial to your soil and climate, or may or may not conduce to the maintenance of your wheat crop, it is well that you should learn the lesson of experience. And I here take occasion to suggest that moisture is the prominent characteristic of the climate of England, and that there is no part of the United States so dotted with lakes and traversed by rivers as the State of Minnesota, and, therefore, perhaps, no part of it so well adapted to the growth of wheat.

There is a fitness of things in the rotation of crops which commends it to our judgment. It is adapted to our necessities. We must have bread, because it is the staff of life; we must have meat, because it is essential to the growth and strength of man; we must have the power of animals to do our work; and we must have gardens and fruits to furnish the enjoyments of life and the comforts of health. The wheat crop supplies our bread; corn enables us to make our meat; rye, oats, and grass to feed the animals which supply our labor; and, therefore, it is a part of God's plan of creation that these crops should alternate, and that their successful growth should be dependent upon one another. He is a daring man, and will ultimately be an unsuccessful farmer, who runs counter to this plain dictate of Providence.

Hessian fly, midge, army-worm, and divers and nameless insects depredate upon the wheat crop, and in the Eastern States smut and mildew prevail to a great extent, and we are prone to attribute these to any cause which will relieve ourselves from the imputation of bad farming. Our daily observation is that vermin always attack a poor and diseased animal, and the analogy is perfect with regard to their depredations upon the poor and worn-out earth. Exhaustion is productive of vermin, vermin of disease, disease of death. Again, we are too much in the habit of treating the occupation of the farmer as a die cast upon the board of chance, to be consigned to the exigencies of time and season; when, on the contrary, all our work should be so performed as to anticipate time and season, and provide for their contingencies.

There is one other subject to which I desire to direct your special attention: the selection of seed. There is no more common idea than that seed degenerates from long use. No idea is more erroneous. If the general principle were true that vegetation degenerates by cultivation, the world long since would have come to an end. The opposite conclusion is true, that cultivation is the improvement and life of vegetation, and that, by a selection of the best seeds, the best roots, and the best animals, improvement is always the result. If a farmer wanting fifty bushels of seed-wheat will run a hundred bushels through a winnowing-mill until he reduces them to the quantity required, he will improve his crop from five to twenty per cent. This is not a new idea; it has the authority of ages, for Virgil, in his Æneid, and in his own peculiar language, much more emphatically and beautifully expresses it:

> I have seen the largest seeds, tho' viewed with care,
> Degenerate, unless th' industrious hand
> Did yearly cull the largest.

I have neither time nor opportunity now to discuss the subjects of stock-raising, wool-growing, and cheese and butter making, for all which

your natural facilities are such as are seldom bestowed upon any people, and I am pleased to know that they have already attracted your attention. They are to be reckoned among that diversity of agricultural employment which necessarily leads to a rotation of crops. * * *

To those who have put their hands and hearts to the work of promoting the great interest of agriculture there is a pleasing consolation, and encouragement, too, in the reflection that they are upon the flood-tide of public favor; that those they benefit now look with confidence upon the efforts they make; that, while the fluctuations of business, the casualties of commerce, the interruptions of trade, the disturbances of society itself, are but incidents of the moment, only occurring to be as soon forgotten; that, while amid the other and conflicting elements of busy life, the pleasing anticipations and profitable speculations of one class are the dreaded forebodings and dire calamities of another, all classes unite in the fervent prayer, the kindly sympathy, the liveliest hope that success may crown the effort of the farmer. Do we appreciate this? Do we now feel that our art commands the study of the philosopher, the science of the scholar, the eloquence of the statesman; that the whole world, with a unanimity which no other subject can command, lifts up its sympathizing voice to cry "God speed the plow?"

There is a reason for this, and it is found in the fact that the product of this art contributes more largely than any other to human happiness, and that the art itself is better adapted to human skill. These are important considerations. How shall we promote this great art is a question which addresses itself to all of us with a force which must command our attention.

First, then, study to know the subject which thus excites our common interest. Is it enough to understand that if the earth be stirred and the seeds be sown their product and all else is a natural result of God's providence? Is it enough that we should be told and believe that the plow is the best implement with which to till the earth, and that seed sown by the hand of man is all that is necessary to enable us to drag through the natural period of our existence, thus made toilsome and miserable? Is it enough for ourselves to know that we but live and move and have our being? Is that large portion of mankind which is engaged in that work of the world content thus to grovel and crawl, only occasionally to be startled into an attitude of amazement at the prodigious products of the minds of men around us, and again to relapse into the contemplation of our own inferior condition? We answer emphatically, *No!* With regard to our occupation we should rather look upon this lovely earth of ours as the beautiful landscape of God's creation, imbued with the powers of life, to breathe and feed, yielding its elements and products to the nursing and delicate operations of our hands. While we follow the plow we should *perceive its use;* we should see in it how the polished mind of man has infused *mechanical science* into its structure; we should mark well the work it has to do, and its adaptation to the work; we should *contemplate* those seeds we commit to the earth, and believe it is not the work of *chance* that they grow, and that they, too, are imbued with the germinating powers of life and light, and characterized in their existence by the qualities of good and bad; and we should know that perfect analogy which characterizes life in its conception, growth in its progress, the product of its results, and the final death of all vegetable as well as animal creation. But above all and over all we should contemplate ourselves; that we are a part of the special work of God's hands, placed here and employed to direct and govern all these things. They are no artificial objects, on which we are to ex-

pend our happy thoughts and lives; they are the delightful things of nature on which you operate, and nature co-operates with you in all your labors and sweetens them to your contented spirits. Rest upon this as the grand secret of your constant attachment to agricultural pursuits. You work with nature and only modulate and benefit by her functions, as she takes up and quickens and completes the work of your hands.

There is a moving, living, acting principle in your labors which distinguishes them from other pursuits. The earth yields its strength and increase to the seeds you cast upon it, to the cattle that walk upon it; the winds seem to blow, the rains to fall, and the waters to run for you; the very frosts and snows of winter give salutary checks to the rankness of vegetation, lighten the soil, and destroy what is noxious; and every principle of animal and vegetable organization and existence co-operates to support and enrich you. There is a charm in this which must last while the spirit of man feels and acknowledges the strivings of his own mind and the power of God around him.

We do not *reason* thus, but we *feel* it; and it is this mysterious and acting charm which has infused its sweetness into the hearts of all rural people in all ages of the world.

That you are not as intelligent and well-informed as a parallel grade of society in towns we must allow; that you are as truly aware of and united to support your interests we do not mean to assert. Your scattered and isolated mode of life weighs against you on these points; but that you have more sincere hearts and a sounder morality is as indisputable; you have a pureness of purpose, a simplicity of mind, as well as manners, that are more than equivalent for the polish and conventional customs of society, and with all a cordiality which is only to be found in the good, homely, hearty hospitality of a country house.

I have thus endeavored to make the impression that, while you have much to learn, yours is a happy condition of life, and that your pursuit is so essential, and its improvement so important to yourselves and the world at large, as to claim for it a high place in the estimation of mankind; and it is for you to make that claim, for the world never respects the man who does not respect himself.

We must take our place, then, in that race of honorable competition into which all the trades and occupations of life have entered, and whose goal is the honor and glory of exalting their own profession and adding so much to the sum of human happiness.

Who possess advantages superior to yours? With every quality of soil, and with a climate which breathes into all the essential vegetables the breath of life and into man the atmosphere of health, what do you want but to call into action the native strength of your own minds and the energies of your own hands? But that mind which gives direction to the hands must be a cultivated mind, for we should never cease to remember that intellect is that "talent" which the goodness of God bestowed upon His own image; not that it should be buried in the earth, and restored upon the return of its Lord and Master in its original simplicity, but that it should be cultivated, enlarged, and appropriated to His great design. It is demanded of us that we should put our hand to the noble work of education, and especially that we should direct that education to a course of study which will fit the mind and adapt the energies of the body to that expansive, interesting, and delightful subject in which you are engaged and for which the world has yet done so little. * * *

It is for you, then, at all times and under all circumstances, to

demand that, in the practical workings of society, your interests shall be cared for; that while common schools and literary colleges receive the fostering care and bountiful endowments of the Government, the farmers' school demands the like support.

We would have you, too, constantly to summon yourselves to the bar of your own consciences, to contemplate the duty you owe to your own children, to compare the life of ignorance, as it gropes along in its difficult path, that seems to have no other object than that it may breathe and live and die, with the brightened intellect of the intelligent man, who acts under the influence of thought, who moves in a sphere of usefulness and thrift, and whose steps *mark* the path he treads through life.

To the merchant and mechanic, the active and energetic motive powers of busy life, we address ourselves and ask you to look with favor upon any project which shall have for its object the education of the farmer. The busy marts of men are filled with the products of his labors; his success and his profits contribute largely to the trade and commerce which are the product of your enterprise. While the abundant yield of the husbandman enriches him, the result is favorably felt in every department of the merchant's counting-house and the mechanic's shop. As, then, you move and make your impress upon the minds of men, let your actions be tempered with the idea that all business, whether in the merchant's store, the mechanic's shop, or the mariner's ship upon the ocean, is dependent for its working elements upon the products of the farm.

To the professor and the student, to you who already possess the lights of reason and enjoy the fruits of knowledge, we will not appeal in vain that your influence may be thrown into the scale of agricultural progress; that, while you have in your own hands that helm of power which gives direction to the elements of government, you will always have in mind that to promote the true and efficient principles of political economy, to expand and increase the influence of that virtue whereby alone we may hope to maintain our own free Government and laws, is to educate the farmer.

We ask of the statesman, while he advocates the interests of his constituents at the bar of the Senate; of the lawyer, who advocates the cause of his client at the bar of justice, and of that sacred office which advocates the cause of man at the bar of Heaven, that they may ever remember the magnitude of your temporal as well as eternal welfare.

Let us not forget to exhort her, whose influence is always so strongly marked upon the character of men from their cradle to their grave, to think of these things: the *mother*, whose affections root so deeply in the existence of her child, whose anticipations are so often stimulated to painful anxiety for its welfare, who watches its progress in life with an eye to doubt and danger, whose hopes may be elevated to the Giver of all good, that he has smiled graciously upon the career of her darling child, or whose fearful forebodings may be realized in the spectacle that he is despised by the society of men and frowned upon by the attributes of Heaven.

In conclusion, I have a word to say with regard to these your annually occurring exhibitions. Here all is reality. You meet your friends, who are embarked in the same enterprise of life and whose thoughts and hearts are congenial with your own. You see many of whom you before had but heard; and here, too, you learn to realize the force of numbers, of intelligence, of the strength of which you are composed, and that power which may be wielded by your will. You carry to your homes.

in your mind's eye, the beautiful models of your art, the judgment of their use, the calculation of their value, and you see those marvelous productions of your fruitful soil which serve to expand your own views of the extent of the workings of your own skill. These are the delightful points in your life, to which the memory recurs with pleasure; they are the safety-valves which let off the pent-up monotony of a country life; and, therefore, we would have you to remember that these exhibitions are yours; that, while you are their authors and finishers, no one of you should ever fail to be their friend and patron.

AGRICULTURAL IMPLEMENTS.

By the Commissioner of Agriculture.

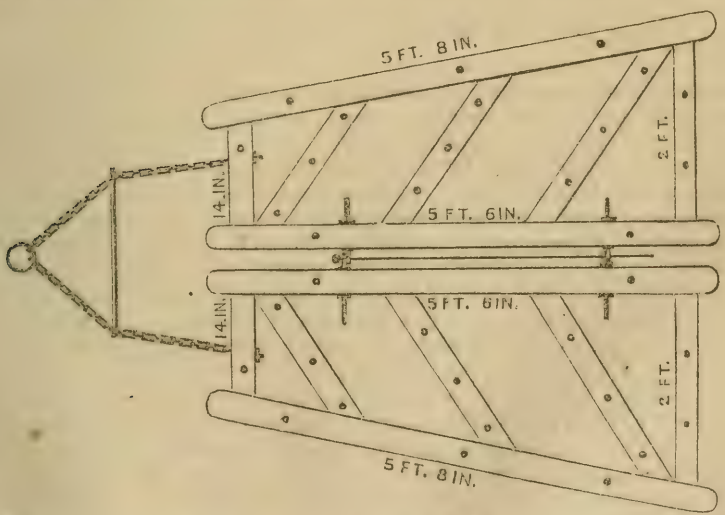
The prejudice once entertained by the mass of agricultural laborers against the use of labor-saving machinery has been entirely dissipated; practical experience having taught that the amount to be done is greatly multiplied by the facility for doing it, and that the demand for laborers continues to increase and wages to be enhanced as the greater amount of labor is accomplished. If two bushels of grain be raised where but one was raised before, the area to be cultivated is greatly increased, and the farmer is better enabled to compensate the laborer, because the aid of his labor has produced a greater amount of profit. These facts, and the inferences fairly deducible therefrom, have led to the abandonment of all opposition to or prejudice against the improved machinery of the farm.

In the midst of the competition which forces upon the market machinery of all kinds, each claiming for itself high qualities and superior capacity, it behooves the purchaser to look well and wisely at the subject, and adopt some general principles which should govern his action in the choice he may make.

To speak of the plow: The same implement will not answer the purpose in all kinds of soil; hence, in making choice of one, the farmer should study the character of his soil and the topography of his farm, for the difference in the mechanical structure of plows is essential. While one is short, abrupt and wide in its working parts, and having no tendency to easy, direct action, another is long, of gradual slope in its mold-board, and its action direct and center-draught. The fitness of each of these must be measured by the character of the work to be accomplished. The object of plowing being to break up and disintegrate the soil, making it pervious to light, heat, and atmospheric food, it seems to follow that the plow that will best accomplish this object is the one which should be chosen; provided, however, that in its use it does not require too much power. In any good plow the principle of direct action, or what is generally termed center-draught, should be found. It consists of such a combination of all the parts, to-wit, mold-board, beam, land-side, bar, and point, that one shall not counteract the operation of the other more than the necessity of the case requires. A competent observer, standing in front of a well-constructed plow, will find its beam, mold-board, bar, and land-side, all in mechanical keeping with each other, not tending in different directions, requiring great power to overcome leverage without accomplishing any useful consequence. The clevis, to which the power is attached, should be back at

the sheath immediately above the mold-board, and connected only at the point of the beam by a rod moving in a rabbet. This arrangement, while it places the point of draught immediately at the work, relieves the beam from the danger of strain and consequent displacement, so destructive of the whole implement. Plows are distinguished by being either right or left handed; that is, throwing the furrow to the right or left side. The use of either is common to particular localities; in some, such a thing as a right-hand plow is not to be found, while in others a left-hand plow is scarcely known. But it may be remarked that where the left-hand plow is used the team is almost invariably driven with a single line, and that of a right-hand plow with a double line; and for the reason—and it is one of the advantages claimed for the left-hand plow—that the lead-horse walks in the furrow, and consequently requires less guiding and less skill in the plowman. There is, perhaps, no implement of husbandry which has undergone so many changes and so many improvements as the plow; and now every part of it is calculated with a mechanical nicety, that it may be the better adapted to the work which it has to perform.

The harrow is an implement of no less importance than the plow, and has, perhaps, undergone as many changes. The rotary, the square, the conical, the single, and the double harrows have all, in their turn, claimed precedence of each other. The position of the teeth, whether they shall incline backward, forward, or laterally, are all mooted points which elicit the inquiry of the farmer. To attain the great object of pulverizing the soil, the rotary harrow has in it a plausibility which demands attention, and if the ground to be harrowed were always free from stubble and weeds it would act well its part; but for practical every-day work, upon all qualities of soil, it is not to be relied upon. Its machinery is too complicated, and it may very well be doubted whether any implement having spindles and journals which come in contact with plowed ground, will answer the purpose intended. But there are certain



principles connected with the construction and use of the harrow which should always be kept steadily in view. The teeth should have such a relative position that they should not follow each other in the same

track; and, further to insure this, the harrow should be so constructed that its motion forward should be steady, swayed neither to the one side nor to the other, either by impediments in the way or inequalities in the surface. It should pursue its course as steadily as the plow itself, for if the teeth are so placed in the harrow that by a straight forward movement they will not follow each other, when the motion is irregular they will follow each other. This is to be prevented only in the structure of the implement and the adaptation of the power so that the draught shall be from two points instead of one. This idea cannot be so well illustrated as by a drawing.

The material of this harrow should be of white-oak or other hard wood, in size 4 by 4 inches, and the teeth of steel three-fourths of an inch square and set straight in the wood. It will be perceived that the main beams may be separated by means of the screws and nuts which connect the parts, thus, so to separate them, as to make it useful to harrow corn at its first stage of cultivation.

The reaper and mower, or the two combined, have become indispensable implements upon the farm, because they greatly cheapen the expense of the harvest, as may be shown by a plain calculation: A machine and pair of horses will easily cut ten acres of wheat in a day, and this requires a driver and six hands to rake and bind.

Allowing cost of team, at	$2 00
Seven men, at $1.50 per day each	10 50
Making the cost of putting up ten acres	12 50

Using the cradle, which is the next cheapest mode of cutting grain, the same number of acres would require—

Five cradlers, at $2 per day	$10 00
Ten rakers and binders, (called followers,) at $1.50 each	15 00
Making the same amount of work cost	25 00

These estimates of cost are based upon prices actually paid in the interior of Pennsylvania during the past summer, so that it is made manifest that the machine is indispensable.

There is no implement by which the farmer is so likely to be deceived as this one. The variety is endless, and each has the sanction of a Government patent for some feature of its structure, to add plausibility to its value. It may truly be said of all these that when new, well put up, oiled, with a good team in the hands of an expert, and smooth ground, they will do excellent work; but on the farm these conditions are not always present, and the implement, which is an expensive one, is found to be wholly inefficient by reason of a radical defect in the mechanical principles of its construction.

The work to be done by a reaper and that by a mower differ in important particulars. One will not do the work of both for the reason that the latter requires a higher degree of speed. Grass stands thicker than grain; the machine cuts closer to the earth and consequently meets with more entangling impediments, and to overcome these there is required a higher degree of speed. By a late invention this is sought to be accomplished by a substitution in the reaper of a spur-wheel of less diameter to work upon the master-wheel, thus producing a higher speed. How far other parts of the gearing may be calculated to endure this

greater strain time and experience will demonstrate. Apart from the consideration of the mechanical construction of the power by which action is given to the knife and reel, there is less difference in the principle of cutting grain than might be imagined; all cut with a knife against a steel, the two forming, as it were, the blades of shears, the former gathering the grain and forcing it against the latter to be cut off. The McCormick machine is, perhaps, the only one which is an exception, for it does not profess to cut upon the principle of shears, the blades of the knife being oval instead of pointed, and therefore incapable of gathering to any material extent; their edges serrated instead of smooth, so that when the standing grain is touched by the knife it is cut. The blades of many other machines have serrated edges, but none of them cut upon the same principle. McCormick of Virginia, and Hussey of Maryland, were competitors for the honor of being the first inventor of the reaper, and they differed in the principle just mentioned, each patenting his machine with this specific difference. It is an essential difference, and one which preserves itself to this day. Of the merits or demerits of the one or the other the purchaser must judge, and in making up that judgment these considerations enter into it. The defect in all machines is that in their operation they choke, and thus fail to cut, and stop. This is occasioned by the obstacles which cause lateral pressure, whether that be the weight of the grain cut or irregularities upon the surface, for as the bar recedes the knife for the moment ceases to operate; but the forward motion still gathers the grain into the shears, until the quantity resists the cutting power, and the operation is clogged and stopped. The claim for the machine which does not thus gather up the grain to be cut is, that it is not to the same extent liable to this objection. Whatever may be said for or against the machine which runs upon one or two wheels, there is no such thing as providing entirely against lateral pressure. The McCormick machine runs upon one wheel, while almost all others have two. It is claimed for these that, having two wheels, they have a broader and firmer base, and are therefore less liable to lateral pressure; but this may well be doubted, inasmuch as two wheels capable of moving backward or forward, or one standing while the other moves forward, are more easily affected than one somewhat imbedded in the soft ground.

To avoid the side-draught and induce a steady forward motion is a geat *desideratum*, and for this reason it is well to consider what is the best kind of team to be used. The whole machine is guided by the tongue, and if it can be kept steadily in its course, lateral pressure is thereby avoided. If there be but a single pair of horses used, the point of the tongue is free to sway from side to side, and the cutting-bar necessarily loses its leeway, and while regaining it the operation of the knife is stopped, and the machine consequently clogged. If four horses be used, this renders necessary the double-tree, single-trees, and long trace-trains, the whole keeping up a continued vibration at the end of the tongue which is ill-adapted to steadiness of motion. Three horses, then, would seem to be more appropriate to the attainment of the object desired. One hitched immediately to the end of the tongue, whose power would be constantly used in drawing the machine, would also tend in a greater degree to preserve a steady forward motion.

We have said that there is scarcely any reaper which will not operate successfully in the hands of a skillful manager, but the farmer should not be deceived by such test. Far better rely upon the charac-

ter which the machine has attained from the judgment of skillful mechanics and experienced agriculturists.

With regard to the mower, which is just as useful as the reaper, and perhaps still more profitable, it should not be used as a combined machine. The work to be done differs essentially. While the one may cut a swath of five and a half, or even six feet, the other should not exceed four. The dense, green, heavy weight of grass cannot be successfully cut closely to the ground in a swath of five and a half feet, while the sparse and comparatively dry straw can be readily cut with a stubble of nine inches. One machine badly answers the purposes of the other, and the farmer cannot afford to dispense with either.

Of all the implements for use upon the farm there is no one which tells of greater benefits than the roller. It pulverizes the clods, smooths the surface for the scythe or the reaper, and compacts the earth about the seeds and roots of plants; but above all, and of more importance than all, it destroys vermin. That the earth should be made fine is the object of plowing and harrowing. The roller greatly conduces to this. That small stones and rough places upon the surface should be driven out of the way of the scythe or mower is a *desideratum* which every farmer will appreciate, and when his seed is first sown, or when the frosts of winter and thawing of the spring have loosened its growth upon the surface, it may be imagined how it would be benefited by giving it a bed in the earth again. But its most useful purpose is less satisfactorily explained, for its proof is only found in the experience of its use. All know that most of the vermin which afflicts the farmers' crops has its resting and often its breeding place in the earth. There, and upon the young and tender plant, is where it deposits its eggs. The cut-worm destroys corn at the surface. The Hessian fly deposits its eggs upon the young wheat-blade, which often falls to the ground. The earth, in fine, is fully charged with the eggs and the embryo of vermin of all sorts, in all stages and in all periods of their existence, and it may readily be imagined what an amount of destruction would follow the passage of a heavy roller over the surface. It may be said without the fear of anything but the doubt which inexperience would suggest, that the farmer who constantly uses a roller will never suffer from cut-worm, army-worm, Hessian fly, midge, or any pest which has its origin in the earth.

The construction of a roller is as important as its use. The one in common use is a single log, six, seven, or eight feet in length, fixed in a frame by a gudgeon in each end. This is wholly unfit for the purpose. It is too long to adapt itself to the surface; cannot be turned without shoving the plowed ground into hillocks, and is heavy to haul. The roller should be in sections—how many is a consideration of little moment, provided the number be even—so that, in turning, while one-half goes forward the other half goes backward, and thus rolls all the time upon its own ground. The cheapest and best roller is made of six sections of fifteen inches in width. These sections are made of cast iron after the manner of a wheel with spokes and hub, by which they are strung upon a common shaft fixed in a frame. The wheel turns upon the shaft, which, if it have a support in the center, is well, but it will work well without. This roller may be profitably used upon corn-ground before it is scored out, and soon after the plant shows itself at the surface; upon oats-ground when it is sown; upon oats when four or five inches high; upon young clover in the spring, as soon as the ground is sufficiently dry to allow the horses' feet upon it; upon wheat-ground to prepare it for the drill, and upon wheat in the spring. It cannot be

told with any degree of certainty when it is that the vermin are destroyed, but it is certainly at all times and periods when they are in the egg and embryo. Let it not be said that this costs too much labor. It is labor most profitably spent.

Little need be said with regard to the hay-rake, for its universal use is sufficient evidence of its value as a labor-saving implement. With a single horse and boy it will do the work which once required eight men. The steel-tooth rake has been greatly improved and perfected by the lever for discharging the gathered hay, instead of the old mode by the foot.

The thrasher is a machine necessarily used upon the farm, but does not always belong to it. The one to be spoken of is an implement of the farm, which thrashes but does not winnow and prepare grain for the market, and one which every farmer should own. It is a horse-power machine capable of thrashing about one hundred bushels of wheat per day. The power requires four horses, and the machine five persons to supply and feed it and remove and put away the straw. It is to be distinguished from the thrasher which winnows the grain and imperfectly prepares it for the market at the speed of three or four hundred bushels per day, and involving the employment of a corresponding number of hands. The use of the one is an operation of the farmer himself, the other that of a person whose business it is to thrash for others. The one thrashes the grain as you want it, and allows the storage of the straw and chaff for future use, such as food and bedding for cattle and the consequent making of manure. The other thrashes the whole crop at once, rendering necessary the immediate disposal of it, and giving you an amount of straw which you have no place to put but into stacks or the barn-yard, or to be otherwise wasted, for such a quantity cannot be converted at once into manure, but is greatly wasted upon the desert air. But the farmer's own machine may be used, if properly constructed, for another useful purpose, that of cutting up his corn-fodder. Fodder-cutters, as they are constructed, do not answer well the purpose for which they were designed. They are not quite equal, in point of strength, either in their construction or cutting-knives, to the work required of them. The spikes of the thrasher may be so constructed as to answer both the purposes of thrashing and cutting. They may be made two inches wide, one edge preserving the rotundity of the spike, while the other may have the sharpness of a knife, and by reversing the cylinder you present the knife-edge to cut the fodder into shreds, or the spike-edge to thrash the grain.

Cultivators are as various in their construction as the minds of men. To destroy grass and weeds and loosen the ground between growing plants is the work they have to do, and the simplicity of it points unerringly to the implement which is best adapted to the quality of soil where it is to be used. If the work is to be done with one horse, there is no implement that will do it better than the old-fashioned double shovel-plow. It has the advantage of being always in hand, to be readily guided to the point where its work will be most efficient. If two horses be used, there are other implements which will do the work much more speedily by straddling the row and operating upon both sides of it.

This treatise upon the subject of agricultural implements is induced by a desire to direct the farmer to the choice of those which are best adapted to his particular purpose, and to point out to him the principles which enter into the consideration of the subject, thereby guarding him against the plausible theories and deceptive appearances which so often surround it.

CULTIVATION BY STEAM.

Mr. O. E. Lawrence, of Magnolia Plantation, parish of Plaquemine, Louisiana, responds to a request from this Department for a statement of the results of his trial of the steam-plow, as follows:

Two hundred and twenty acres of my cane crop, one hundred and forty acres of which were plant canes, and eighty acres first-year rattoons, were, I believe, as thoroughly plowed and cultivated by steam as could be desired. The plant canes were grown upon land which, after yielding a crop of corn, was again broken up by the steam-plow 26 inches deep; then, during the winter, laid off in rows fully 8 feet apart and 8 inches deep. In the month of February the cane was planted and covered carefully with a hoe. I avoided carting the seed cane for plants upon the land, carrying it in from each head-land by hand. The seed was good, and was planted in the usual way by laying down three canes in each row. It came up well, giving a perfect stand. In the months of April and May, when the plant cane was about 18 inches high, I subsoiled the crop with my five-tined *steam cultivator* 26 inches deep, twice between each row, working over about ten acres each day. It left the land thoroughly loose and pulverized, and elevated about 6 inches above the level before sub-soiling. This, as the canes began to shade it, was clean and free from grass, and thus was obviated the necessity of giving them at this period of the season any more work, which in ordinary cultivation is always requisite. The cane continued to grow with great rapidity, and on the 10th of June, when it was large enough, and the ground sufficiently settled to bear up the mule-teams, I gave it a thorough plowing with our two-mule plows, following with the hoes, hilling and laying it by. Thus the entire crop, with the exception of this last working, was *cultivated and made by steam.*

On the 1st of September these canes were blown down very flat, from which they only partially rose. They cut for the mill, when rolled in December and January, from 7 to 12 feet in length, and this after being frosted so that we had to throw away the first two joints.

The juice weighed but 6½ to 7 degrees Beaumé; but under the circumstances the yield was over 3,000 pounds of double-refined sugar to the acre, and had the canes stood up until cut for the mill and been as ripe as our canes usually are, I feel satisfied they would have produced over two tons to the acre, and this upon old heavy clay land.

The eighty acres of first year rattoons grown from the stubbles of the *steam-plowed cane*, planted in a similar manner last year, were barred off and well dug in the month of March, then subsoiled and cultivated by steam precisely as the plant-canes. The yield was over 2,500 pounds of sugar to the acre.

Deep steam-plowing upon well ditched lands, I have always believed, would result in an average yield of over 2,000 pounds of sugar to the acre, but this was when I only expected to use the steam-plow in the breaking up of the lands. The use of steam for deep subsoiling in the cultivation of the canes, I confess, has far exceeded my expectations, and I am fully convinced that an average yield of even much more will be realized, and this too with less than half the labor now employed under the old system, in which the average yield is not over 1,000 pounds of sugar to the acre. To this may be added the complete preservation of our stubble canes against the cold and winter rains, so often disastrous to our rattoons.

The advantages of deep plowing and subsoiling by steam over the ordinary cultivation by horses, and the consequent trampling and packing of the ground, can hardly be overestimated. It enables the land to absorb the heavy rains and prepares it for the free admission of air and heat, and thus changes entirely the character of our soils—rendering the heavy clay lands productive and easily worked in seasons of drought, which we are so often subjected to. The crops grown upon deeply-plowed lands sustain no injury. This has been constantly my experience; in fact the steam-plow seems to command the seasons, enabling the soil at all times to retain and transmit moisture, upon which fertility mainly depends. But I fear the prospect at present is not very bright for the extension of steam cultivation in our State. A long war, with the breaking up of the most of our large plantations, the entire destruction of our labor system, followed by scarcity, inefficiency, and high price of labor, and this by a succession of bad seasons, together with enormous taxation, has to a great extent disheartened our planters and paralyzed their energies; and though they have made almost superhuman efforts to restore their estates, yet to-day we have to witness, lamentable as it is, this once great and prosperous interest almost in its last throes of existence. Many of our finest plantations are now abandoned, and offered for sale without purchasers at less than half the cost of the improvements.

Deep plowing; less land cultivated, and that done much better; the introduction of steam-plows and the lands plowed by contract, (where the proprietors do not choose

to purchase,) as is now done with eminent success in England and other countries, and a check to our excessive taxation, would soon restore us. With this every suitable effort should be made and inducement held out with a view to bring to our fertile lands and genial climate, so rich in promise, the enterprising and intelligent emigrant of every nation. Then, as the future surely indicates, will come a division of our lands with the division of our system of labor. The large and costly sugar-houses will be employed as central factories; capital and labor will blend harmoniously together, and, I trust, a new era will dawn upon our now depressed and struggling people.

In justice to the eminent inventors and manufacturers of the double engine steam-plowing tackle and implements, John Fowler & Co., of Leeds, England, I can only say, after three years' experience with two complete sets of their tackle, that the ease and facility with which they are handled, their simple and perfect application of power, and the completeness in every way in which they are worked, entitle them to the high appreciation with which they are now regarded in every part of the civilized world. And I trust the genius of American inventors, which has been constantly but unfortunately directed to the construction of a traction-engine, moving like horses over the land, with the plows attached, which must continue to be a failure, will soon be convinced that the *double-engine* system, in which two engines upon opposite head-lands, carrying the winding-drum and alternately paying out by single line of wire rope, pull the implement between them, is all that can be desired for the most perfect system of *steam-cultivation*.

Necessity will soon compel us to take a "new departure." The constant increase of emigration and population in the grain-growing States of our country will soon demand a better cultivation and increased production. In England steam plowing has increased the yield of wheat from 16 bushels to 28 bushels to the acre.

I do not believe the agricultural interest of our country can much longer turn a deaf ear to this last and greatest achievement of steam—its successful application to the cultivation of the soil. It has broken the yoke, and lifted the burden which, for ages, held both man and beast in bondage, ameliorating their condition by making that which was most onerous, easy and attractive; it has elevated labor and dignified the plow.

E. LAWRENCE.

NORTHERN AND SOUTHERN FARMING.

In March last a communication was addressed to the Commissioner of Agriculture by the secretary of the Beech Island Farmers' Club, in South Carolina, making certain inquiries concerning the comparative advantages of the different methods of farming at the North and South, with particular reference to the cost and the profits of culture. To this communication the Commissioner responded as follows:

HARRY HAMMOND, *Esq.*,
Secretary Beech Island Farmers' Club, Augusta, Georgia.

SIR: In reply to your letter of the 2d instant, I feel sincerely inclined to give you all the information which I have upon the various points of inquiry which you make. Let me premise, however, that the short experience which you have had does not justify the conclusion that the work of the farm cannot be profitably done by hired labor, with the usual concomitants of a farmer's family. Experience in the Northern and Middle States has taught us otherwise. Farmers there live comfortably, improve their farms, and often grow rich; and with your soil and superior climate there is no reason why you may not do the same thing, especially as the product of your land has a greater money value, acre for acre, than in the Middle States. In answer to your several queries, let me instance an agricultural district in the interior of Pennsylvania, where land is worth about $100 per acre, when improved with house, barn, and necessary out-houses. Such farms will average in size about 120 acres, most of the land being cleared and fenced into fields of about 15 acres. The force that works the farm is generally the farmer and his two sons; or if he has but one, he must have one hired hand, to whom he would have to pay about $20 a month, and board him. It would require six horses or mules to do the work; it would sometimes be done by four; there would be 8 cows and as many young cattle, and sometimes 12 sheep, and perhaps 10 to 15 hogs. Sometimes the farmer will require additional hands, for which he will pay about $1 per day, and in harvest one half more, for raking and binding after a reaper

and hauling in, but not quite so much for hay-making. From this an average product would be:

Wheat, 800 bushels, worth		$1,200 00
Oats, 1,200 bushels, worth		480 00
Corn, 1,200 bushels, worth		600 00
		2,280 00
Deduct from this, of wheat for bread and seed, 150 bushels	$225 00	
Oats for feed and seed, 300 bushels	120 00	
Corn for feed and seed, 400 bushels	200 00	
		545 00
		1,735 00
Pay of one hand	240 00	
Extra hands	110 00	
		350 00
		1,385 00
From this farm there would be realized for potatoes, turnips, fruit, garden vegetables, butter, eggs, and poultry, about		600 00
		1,985 00
All the hay, fodder, and straw are consumed upon the farm; the wool is worked into clothing and blankets; and there will be expended in clothing for family, blacksmith's bill, and repairs of farm, &c		985 00
Leaving a cash balance of		1,000 00

Now this is an account of the operations, practically, of a thrifty farmer, who understands his business. He takes his breakfast, and has his horses fed, geared, and watered, that they may be in the field at sunrise. He gets his dinner about 11 o'clock a. m., and is in the field again by 12 o'clock, and quits work about sundown.

What it costs to break up an acre of ground, no one can answer; nor would an answer be of any value. And the same may be said of the cost of planting an acre of wheat or laying an acre of corn. These are items in the business of a farm which cannot be aggregated for any valuable conclusion, nor can it be told how much it costs to put up 100 feet of fence. As to all these things, so many circumstances exist as to render any truthful estimate at one point wholly inapplicable to another. It is undoubtedly true that a hired laborer at the North will do double as much work in a day, as a black man will do in the South. This is doubtless attributable to the fact that the one has been educated to work, because to earn his wages he must; the other to avoid labor, because his compensation was the same whether he worked or not. This will not always be so, for the time is coming when free labor will produce about the same results everywhere. There are many colored laborers in the Middle States whose capacity for labor is quite equal to that of the white man, and who earn the same amount of wages.

If farms are leased to tenants, they pay the road and school taxes, and the landlord the county taxes. Each finds one-half of the seed, and receives one-half the products, all hay, straw, and fodder being used upon the farm.

About one-third of the land will be put into wheat, and one-third into corn and oats, and the remainder into grass; and it is becoming a common practice, and a good one, to turn no cattle out to pasture until after the grass is cut and the hay made. This grass is of mixed clover and timothy, the latter sowed in the fall with wheat, and the former in the spring, after which the field should be rolled for the double purpose of embedding the clover seed, and making smooth the ground for the greater convenience of reaping the crop.

When the wheat crop is taken off, the young clover should not be pastured much, and it would be better if not at all. The next year's hay is here made; and at this point one of your difficulties occurs. You have no barn to put it in, and I am aware that it would be difficult to convince you that you have any necessity for one. You persuade yourselves that your climate is such that cattle do not require shelter. This is to be unmindful of the fact, that this is the least important function of a barn. In the South 15 per cent. of your products is wasted in cutting, gathering, stacking, and thrashing, while it should be hauled in good time and stowed away in a barn, where you may thrash it at your leisure, and feed your hay, fodder, and straw to your cattle, which would thereby be employed in manufacturing materials into manure that would otherwise be comparatively lost in the exposure to rain, sun, and wind. If cattle be kept in a barn and its yard, from the fall until the following June, and during May and June fed with grass cut from the fields for them, they will have used up all the

hay, fodder, and straw, and manufactured it into manure that will be sufficient for 20 acres, and this should be put upon the clover sod, preparatory to corn planting the following spring; for which purpose the ground should be deeply plowed, so as to put the manure beyond the reach of a shallow plowing for oats the following spring. When this crop is taken off, then plow deeply for wheat, so that the manure may be thoroughly mixed with the soil, and in a proper condition for the following wheat crop. This rotation, or an equivalent, is absolutely essential to successful and profitable farming.

Southerners are peculiarly an agricultural people; and yet about their farms there is a manifest indifference and carelessness about their condition. The fences are broken down, gates out of order, buildings out of repair, and implements lying around. It cannot be expected that the employés shall be diligent and systematic in the midst of disorder and confusion any more than a mechanic should perform his duty with indifferent or dull tools or a careless employer. It is easier and less expensive to have things in order. With neatness and care, there is a spirit of pride and emulation which enters into the actions of every man and woman employed, and diffuses itself into all the operations of the farm, to the great profit of the farmer.

Before I close this letter, which has been written hastily and amid very much interruption, I desire to commend to your attention the use of lime. It is one of the large constituent properties of grass, especially clover, without the use of which no successful farming can be accomplished. Clover is a grass, too, which of all others will endure heat and cold. Nature has given to it a tap-root, which enables it to seek moisture and protection to a greater extent than many other grasses the roots of which are much confined to the surface.

I trust I may have given you some useful hints about farming. I did not intend to do more.

Very respectfully,

FREDERICK WATTS,
Commissioner.

This letter was referred for consideration to a committee of the club, who subsequently submitted the following report, a copy of which was courteously transmitted to the Department:

Report to the Beech Island Farmers' Club on a letter received from Hon. Frederick Watts, Commissioner of Agriculture.

Your committee have read the letter of Hon. F. Watts, referred to them, with great care and interest. Mr. Watts draws our attention to the fact that "our short experience" does not justify the conclusion that the work of the farm cannot be profitably done by hired labor; and after stating that farmers in the Northern and Middle States "live comfortably, improve their farms, and often grow rich," continues: "With your soil and superior climate there is no reason why you may not do the same thing, especially as the product of your land has a greater money value, acre for acre, than in the Middle States." Of the correctness of this view there is not a reasonable doubt. We have had our days of gloom, and it would hardly be candid not to admit that there is some discouragement and anxiety still. But we cannot fail to recognize the important fact that failures, where they have occurred, came from causes which lie mainly outside the provinces of legitimate planting. Neither our soil, our climate, our products, (the money value of our great staples in the market,) nor our labor, can fairly be taxed with them. In reference to the latter, it is only fair to the negro (the chief laborer) to state, that away from the towns and villages, and the malign influence of politics, as a rule, whenever fairly treated, he has been docile, steady, and effective, comparing favorably, we believe, with hireling laborers elsewhere, and unquestionably the best workers in our cotton-fields. Mr. Watts' statement that "it is undoubtedly true that a hired laborer at the North will do double as much work in a day as a black man will do in the South," is a popular notion there and here, but one, we believe, that could hardly be sustained by facts. In many kinds of labor, incident to small grain and grass culture, rearing stock, and managing the more complex agricultural implements, the negro has little practice, and therefore possesses little skill. But he is a good plowman, following the team as far as it ought to be driven in a day, and doing well, not only the coarser work in the preparation of the soil, but also the more delicate manipulations required by the young plant. And with the hoe, the chief implement in cotton culture, he has, from long training, acquired celerity, precision, and in short, efficiency, which the laborer of any other country would find it hard to rival. To get full work from him it is necessary for him to feel that his pay is sure, and a part of it at least in some shape directly before him, and to thoroughly understand that the amount of work will be required of him, and that he can and ought to do it; which doubtless, are about the only

conditions under which full work is got from the hired laborer anywhere. We quote the following passage entire from Mr. Watts's letter, and commend it to the careful attention of the club. It exposes the chief defect in the training and habits of the southern planter, to which may be traced a large share of his troubles: "Southerners are peculiarly an agricultural people, and yet about their farms there is a manifest indifference and carelessness about their condition; the fences are broken down, gates out of order, buildings out of repair, and implements lying around; it cannot be expected that the employers shall be diligent and systematic, in the midst of disorder and confusion, any more than a mechanic will perform his duty with indifferent or dull tools or a careless employer. *It is easier and less expensive to have things in order.* With neatness and care there is a spirit of pride and emulation which enters into the actions of every man and woman employed, and diffuses itself into all the operations of the farm, to the great profit of the farmer." These remarks are worthy of consideration. We all assent to them, but something more than this is necessary. We must take the truths they convey, and carry them home with us, and set about at once conforming our daily practice to them. Permanent success can only be assured by careful, unremitting, systematic, vigilant attention to details. Without that, no amount of general information, or of intelligence, or of energy, can gather the fruits of labor, but again and again we will find ourselves robbed of the best results of enterprises, however wisely planned and energetically pursued.

But while we unquestionably need to cultivate more orderly and systematic habits of attending to details, and there is vast room for practical improvement about our plantation buildings, fences, &c., it is not necessary, and would hardly be prudent for us to emulate the prim neatness of the New England or Middle States farmer. Our planting is done on a much larger scale and under very different conditions. Their handsome barns, neat brick out-buildings, painted yearly, multiplicity of expensive stone fences, &c., are no more essential to us than are the decorations of the fancy store to the wholesale grocery.

A large and not the least interesting portion of Mr. Watts's letter is devoted to a minute account of the operations of a thrifty northern farmer. It is especially interesting to us, in enabling us to compare the results of farming here with those obtained under favorable circumstances elsewhere. An improved farm is instanced, of "about 120 acres," in the interior of Pennsylvania, worth about $100 an acre, or $12,000. It is stocked with 6 horses or mules, (the work would sometimes be done by 4,) 8 cows and as many young cattle; sometimes 12 sheep; 10 to 15 hogs; and the force which works is generally the farmer and his two sons, or if he has but one, he must have one hired hand. Adding the value of the stock, of the necessary supplies, outfit in wagons, carts, implements, seeds, &c., and ready money required to carry on the work to the original cost of the farm, we will find the investment to be probably between $16,000 and $17,000. The money value of the gross products of this farm in wheat, oats, and corn, is placed at $2,280, to which must be added $600 realized for potatoes, turnips, fruit, garden vegetables, butter, eggs, and poultry. All the hay, fodder, and straw, are consumed on the farm; the wool is worked into clothing and blankets, and after providing bread and clothing for his family, feed for his stock, and paying for blacksmith's work and repairs of farm improvements, &c., a net cash balance is left in the hands of the farmer of $1,000. This we are told is the result of the operations of a thrifty farmer who understands his business. He takes his breakfast and has his horses fed, geared and watered, that they may be in the field at sunrise. He gets his dinner about 11 o'clock a. m., and is in the field again by 12 o'clock, and quits work about sundown.

There is evidence here of care, industry, and economy; but the results are not such as might safely be calculated on in planting in the South with equal care and industry and equal capital. Sixteen or seventeen thousand dollars would not have enabled one to plant largely before the abolition of slavery, when to get the labor it was necessary to own the laborer. But there has been a great revolution in this respect, and now a judicious investment of that amount, going wholly even upon the cash system, would place one among the larger planters. We will instance a plantation of 800 acres, among the better class of uplands in a healthy locality in Edgefield or Barnwell Counties of this State, or the adjacent counties in Georgia, about which we can speak with authority and accuracy from our perfect familiarity with them. Supposing this place to have the usual improvements, with 500 acres of cleared land and 300 in the woods, and labor secured and work commenced early in January, the following figures will show about how the investment should be made, and what results could be obtained the first year:

CASH OUTLAY.

800 acres land	$8,000
10 mules	1,750
2 wagons	300
3 carts	150

2 yoke oxen	$150
1,000 bushels corn	1,000
Gear and implements	300
Guano	900
Seeds	150
Wages, 22 hands	2,200
Feed, 22 hands	550
Extra labor	400
Total	15,850

CROP.

Cotton, 250 acres, 100 bales	$10,000
Corn, 150 acres, 1,500 bushels	1,500
Oats, 25 acres, 375 bushels	300
4,000 bushels cotton seed	600
Total	12,400

ASSETS.

800 acres land	$8,000
10 mules	1,600
2 wagons	200
3 carts	100
2 yoke oxen	125
Gear and implements	100
Total	10,125

Assets	$10,125	
Crop value	12,400	
		$22,525
Cash outlay		15,850
Balance		6,675

Forage is not taken into account, because enough should at least be made to meet the demands upon the place. Neither is any estimate made of family expenses, which would vary indefinitely, according to the tastes, habits, and circumstances of the proprietor. All the fruits and vegetables in their season might easily be had; while with diligence and care milk, butter, poultry, eggs, and even pork, mutton, and beef, sufficient for family use, could be added to the products of the plantation, almost without an appreciable increase of expenditure.

It will be seen that cotton is valued at 20 cents per pound; it is now worth about 22 cents in the home markets, and the net profits of the plantation vary $500 with each fluctuation of a cent in the price of cotton.

Production is placed in the above calculation at a little less than 5 bales to the regular hand, or a little less than 4 bales to the hand, counting in the extra labor; and it is worthy of notice that the net profits of the business are increased $2,200 with every increase of one bale per hand. The average production here is probably 3½ bales per hand, while successful planters make 4, 5, and even 6, and occasionally we hear of 8 and 10. Does agriculture offer anywhere else such great rewards for intelligent and persistent effort? In evidence of the fact that the results of the above calculations are clearly within the limits of what may be done, we give here statements of the crops actually made and gathered last year by members of this club:

Mr. Page, from 18 acres of improved upland planted in cotton, obtained in money $2,150. His entire crop, with 5 hands and 5 mules, was 19 bales of cotton and 2,400 bushels of corn, besides peas, pumpkins, sweet potatoes, and forage and 4,000 pounds of pork. This plantation was bought by Mr. Page five years ago for $4,000 in currency.

Mr. E. S. Hammond, on a poor quality of upland worth $6 per acre, (recently bought for that,) worked two hands and two mules; money value of cotton, corn, hay, and sweet potatoes, $1,600, besides 1,500 pounds of pork, and fruit and garden vegetables in great abundance.

Mr. G. B. Mills, on medium upland, worked three hands and made 21 bales of cotton, corn and forage in abundance, and 500 bushels of sweet potatoes.

Mr. B. T. Page, managing for Mr. Barny Dunbar, worked thirty hands, and made 161 bales of cotton, 3,000 bushels of corn, 400 bushels of peas, besides forage, sweet potatoes, vegetables and fruits in abundance, and killed 7,500 pounds of pork. The plantation on which this crop was made was bought two years ago for $9,700 in currency.

If, then, cotton culture is so profitable, why, it may be asked, are cotton lands so cheap, and why have not cotton planters grown rich from the six crops made since the war? These are pertinent questions, and we will answer them briefly. Land is cheap because it is superabundant and out of all proportion to labor and capital. Our capital was destroyed by the war; and capital has not come here from abroad for permanent investment, partly on account of ignorance concerning the profits to be derived from its employment here, and partly from an old-time prejudice against the South, but mainly from the sense of insecurity arising from the universal impression that our State governments have been inclined rather to plunder than to afford adequate protection to property.

It is one thing to make money and another altogether to accumulate wealth. That cotton planters have made money there is ample evidence to show in their yearly production of cotton to the value of nearly $300,000,000. But why have they not grown rich? When the war ended there was an almost universal disbelief in the possibility of making cotton with free negro labor. Those who first undertook the experiment did so with great distrust, and proceeded with the utmost caution, practicing a rigid economy. The result was that despite a very bad season and a short crop, the crop of 1866 was probably the most profitable ever grown in the cotton States.

The fact demonstrated that cotton could be made, and that cheaply, with free negro labor, and the staple fetching three times its former price in the market the prospect seemed golden. Those who had already been at work sought to double their operations; and others, of all classes and employments, rushed into cotton-planting. The cotton which had gone forward enabled the merchants to re-establish, to some extent, their credit at the North, and obtain money there which they in turn advanced, often recklessly, to those who sought their aid, but at exorbitant rates of interest. It was not uncommon for men without capital to rent land and get advances from factors at 25 per cent. or more interest, on simple pledge of a crop not yet in the ground, to buy stock and outfit, provisions at hitherto unheard-of prices, and large quantities of commercial manures. The most extravagant expectations were indulged, and the most extravagant measures adopted. In short, the country was run mad; traders, merchants, planters, all were making haste to get rich. The crop, notwithstanding all this expenditure, was not a good one, while large estimates were entertained of it in all the great cotton markets, and the price ran down before the close of the year to 13 cents per pound. Planter and factor fell together; thousands of both classes had to give up their business altogether, and the whole country was brought to the verge of bankruptcy. Clearly this disaster could not have followed as the result of legitimate planting, but was brought about by the wildest speculation.

Fortunately there was a large and rapid rise in the price of cotton in the months of January and February, 1868, which enabled those planters who were not utterly broke to get enough money from the remnants of their crops to go on on a more moderate scale. There was a return to the ways of prudence and economy and sober work, and the crop of that year was a remunerating one. So also was that of 1869. But 1870 was a repetition of 1867; the same extravagance, similar results; thousands ruined, all former profits swept away, and a burden of debt incurred. It was not planting; it was speculating. Again, in 1871, care and economy bore their lawful fruits, and in spite of a bad season the crop paid well. Cotton-planters, forced by their crippled condition to a prudent and economical management of their affairs, have made four profitable cotton-crops; and two, when tempted by success and the hope of getting rich all at once to disregard the only certain conditions of success, which neutralized the results of the other four.' It may be hoped that a severe experience will prevent them from being again deluded into speculative planting. With patience and prudent, sober, and steady industry, and such protection from the honest administration of just and equal laws as every government owes to its citizens, a career of prosperity is open to the South not surpassed by anything in her former history.

PAUL F. HAMMOND,
WM. PINCKNEY STARKE,
WM. H. ATKINSON,
Committee.

In reference to this report, the Commissioner addressed to the club the following letter:

WASHINGTON, D. C., *August* 7, 1872.

SIR: The letter of your recording secretary, communicating to me the report of a committee of your society, to which was referred my letter on the subject of "Southern planting," has reached me, and I cannot forbear the expression of the pleasure which its perusal has afforded. It was with no unmeasured degree of hesitation that I ventured to treat the subject at all, because I felt that it was the discussion of that

which must have undergone the deliberation of able minds, whose promptings of interest would impart a practical discernment which I could not claim for myself. I am the more pleased, therefore, that I am not charged with the fault of arrogating to myself the right to make suggestions which I believed might, at least, lead to a profitable discussion. Your committee has given it that turn, and I feel sure that southern planters will be much edified by the dispassionate and very sensible views which have been thus so clearly expressed. I will take care that their opinions shall not be lost.

This Department is not unmindful of the condition of the southern people, and it is in no spirit of exultation that we declare its purpose, in the exercise of its legitimate powers, to aid those who most need all its information and the benefits it has to bestow.

I note the remarks made in the report on the subject of the size of farms, and am not at all surprised at its reckonings, for your early teachings run thus; and you will be no more surprised at the expression of my conviction, that one-half of 800 acres, under proper cultivation, and with far less labor, will make a greater product.

If southern planters will believe and act upon the fact that there is an element of fertility given to the soil by a proper rotation of crops, which no amount or quality of applied fertilizers will long continue to supply, they will be greatly benefited. You may make the earth drunk with applied manures and stimulants, but it is a drunkenness which stimulates to ultimate exhaustion and death.

I am, very respectfully, your obedient servant.

FRED'K WATTS,
Commissioner.

DR. H. B. COOK,
Corresponding Secretary of Beech Island Farmers' Club.

In the rejoinder of the club to this letter of the Commissioner, the corresponding secretary says:

Your letter in response to the report of our committee is so kindly complimentary, and expresses such generous sentiments toward our people in their present exhausted condition, and coming from so distinguished a source, that I beg leave, in the name of our society, to return you our very warm thanks for the same.

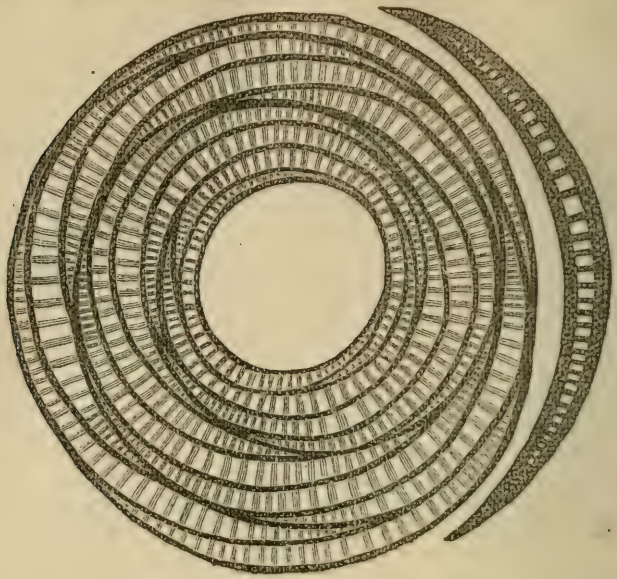
THE MANILA HEMP PLANTAIN.

Mr. William Grange, of the Imperial Ottoman consulate, Baltimore, has sent to this Department the following communication, forwarded to him by a resident at the Philippine Islands, who is thoroughly conversant with the subject:

The hemp plantain, (*Musa troglodytarum textoria,*) called by the natives of the Philippine Islands abaca, is a species of the genus *Musa*, growing wild all over the islands. It yields a small, inedible fruit, in appearance like that of the ordinary plantain. The trees attain a height of 20 to 30 feet; grow wild, but are usually cultivated in groves, in which they are placed 3 to 4 feet apart. The mode of cultivation is rude, consisting simply in keeping the groves free from weeds and noxious plants. At the age of three years the tree has attained its growth, and is fit to be cut down. After its fruit has ripened, the tree will not yield any hemp. It is the stock or trunk which furnishes the fiber. After this has been cut, there springs up from the same root a number of trees, at intervals of a few months, so that a well kept grove can be cut about twice a year. The tree is cut a few inches above the ground. The inclosed diagram displays the formation of the trunk, which, it will be seen, is composed of over-lapping strips, or layers. These strips are separated from each other after the trunk has been trimmed of its branches. The strips are from 3 to 4 inches wide, and from 5 to 10 feet in length, according to the length of the trunk. The strips are next sub-divided into narrower ones, and drawn by hand over a knife, the strip being pressed upon the knife by an underlying piece of hard wood, and the tension managed by a treadle. This operation cleans away from the fibers the watery and fleshy parts of the plant, and it only remains to dry the fiber in open air when it is ready for market. It is necessary to pass the strip over the knife twice or thrice before the fibers are left perfectly clean throughout the entire length. One man at the knife and one to cut down the trees, transport them, and separate the strips, will clean about 25 pounds per day, though this is rather above the average. From 150 to 200 trees are needed to produce of fiber one picul, (137½ pounds Spanish,) or 140 pounds English; 3,200 trees for one ton of 2,240 pounds.

When we consider the small amount of hemp which an Indian produces per day, about 12 pounds, we are astonished at the enormous quantities of it exported from the East, to England in particular, reaching many hundred thousand bales annually,

with yearly increasing proportions. At the rate mentioned above, 12 pounds per day, and allowing three hundred working days in twelve months, one man could only produce about 1½ tons; and for 500,000 bales, or, perhaps, 200,000 tons, it would require the constant labor of about 150,000 men all the year round. Nor can we sufficiently



wonder at the extraordinary low earnings of these Indians—not exceeding the price in the islands of his half-share of the hemp, namely, 6 pounds, worth there about 18 cents. And yet, this insignificant pittance suffices for the wants of himself and family.

This variety of hemp plantain is unknown in the United States. If some specimens were to be imported and propagated, it might become a source of immense profit in the Southern States. No species of the genus *Musa* examined in the South, or South America, posseses the manilla fiber. The plantains of this continent are too watery to allow of the formation of useful fiber in the trunk.

The writer calls attention to the importance of inventing an effective machine for separating the fiber. He states that such an invention, in order to be of value to the islanders, must combine cheapness, simplicity, and portability, with economy as compared with their hand-process. There are no slaves in the islands. According to established custom the laborers work either on shares, or as small proprietors. If a machine is costly, they cannot buy it; if it is complicated, there is not the requisite skill either to work or to repair it; if it is not light and easily moved, there are not facilities for transporting the hemp-trees to that, or that to the hemp-trees; and if it cannot be worked economically, there is no advantage in it.

ENTOMOLOGICAL RECORD.

By Townend Glover, Entomologist.

Beetles in decaying peaches.—Mr. Richard H. Day, Baton Rouge, Louisiana, wrote to the Department July 8, inclosing a specimen of a beetle that he had reared from infested branches and fruit of the

peach, and, according to his letter, the entire leaves and fruit put up in the bottle were literally devoured when he removed them. He also stated that the peach crop was rotting badly before maturity, and asked if the insect could have connection in any way with this condition of the crop.

In a letter written August 19, however, he says that "although numbers of my trees show evidence of disease, it certainly cannot be traced to the ravages of this insect." He further states that "the ravages of the insects were first noticed last spring in going through the orchard to prune." His attention was attracted by the great number of small branches dead and dying since the spring's growth had started, and upon tracing those branches down, he invariably found in the branch at the base of the leaf a puncture covered over with dried gum. Sometimes the puncture was so recent that only the first leaf above was dead or dying, but death always followed the branch from the puncture up to its extremity, and almost as invariably traveled down till it came to a lateral branch, where the poison seemed to be arrested. It was observed that these punctures were always either in the tender wood of the preceding fall's or present spring's growth.

He examined many of the diseased branches with all possible care, and though he was unable to find either insect or eggs, he was satisfied that the injury could be traced to insects, and so a number of specimens of twigs, or terminal shoots, were forwarded to the Department. These were carefully examined, and no eggs or insects could be discovered in the twigs. Mr. Day was advised, however, to put a number of injured specimens in a glass jar, and watch them carefully to see if any insects came out of them. This he did, but placed some twigs with young fruit on them. After watching them for a number of weeks he paid no further attention to them, supposing the insects had all escaped before he placed the branches in the jar; but later in the season, having occasion to use the jar, he found a number of small beetles, and discovered to his surprise that the leaves and fruit were nearly eaten up. One of these, the others escaping, he sent to the Department for identification.

On the 29th of August he wrote again to the Department, stating that he placed four specimens of diseased peaches in an empty quinine-bottle, with a view of determining whether his opinion was correct "in ascribing this general and wide-spread disease of peaches to the depredation of insects, and also whether this insect is the same as the one that commits its ravages upon the tender branches of the trees in the spring."

Fig. 13.

On the 27th of the month the first beetle appeared from this lot of specimens, and he subsequently sent the bottle, with peaches and insects inclosed, to the Department for examination by the entomologist. On examination, these beetles were decided to be *Arœocerus* (Sch.) *coffeæ* of Fab., and the shriveled peaches sent were literally riddled by their larvæ, a specimen of which was sent in June, and is figured, (Fig. 13.) Six perfect beetles made their appearance from the three specimens of the dried fruit last forwarded; but the insect first mentioned as attacking the twigs in spring, is most probably another insect, and may prove to be the *Anarsia pruinella*, of Clemens, mentioned (with figures) on page 305, of the monthly report for July, as having injured peach-twigs in Maryland.

Another season, however, will decide the question, if Mr. Day, or any of our correspondents in Louisiana, or elsewhere, will send specimens

of the twigs, as soon as injured in the spring, when one may be able to detect the insect. It appears to us that the *Arœocerus coffeæ*, would not be likely, in the larvæ state, to injure living healthy twigs in the manner described. The insect, however, may probably be found under the bark of diseased trees, and there is no doubt whatever that, in the larvæ state, it attacks partially rotten and shriveled fruit, as proved by the worm-eaten appearance of the specimens sent.

WORMS IN PEACH-TREES.—A correspondent of the Department, when examining his peach-trees for the peach-tree borer, discovered a great quantity of small whitish worms, about the 0.40 of an inch in length, and of a very slender form, swarming in the exuded gum, sawdust, and feces with which the mouth of burrows made by the peach-borer (*Ægeria exitiosa*) were filled. These small worms he considered the young larvæ of the borer, and sent them to the Department for examination; they were carefully placed in a bottle and fed until they changed into naked pupæ on the surface of the earth, or a little below it; and in about eight or ten days after the pupæ were fully developed, the perfect insects made their appearance in the form of minute two-winged dark-colored flies, which were at once recognized as the *Mycetobia* (*Mycetophila*) *persicæ*. Several of this genus feed upon fungi, and one species, very similar, is mentioned by Dr. Packard as living in the putrescent sap under the bark of elm trees. Our correspondents, however, have no occasion to apprehend any injury from this insect, as it only appears to feed upon the exuded gum, &c., and has nothing to do with the larvæ of the peach tree borers, which, even when very young, can be readily distinguished by their heads, their more robust forms, and by their six small feet on the first three segments of the body—while the larvæ of the *Mycetobia* is long and snake-like in form, and has no feet whatever, and is perfectly innocuous to the peach-tree.

Fig. 14.

NOTE TO CORRESPONDENTS.—Owing to the very imperfect descriptions given by some of our correspondents of the insects sent to this Department for examination and identification, it is hoped that hereafter they will either describe them more fully, or, what is much better, send specimens of the insects themselves by mail, so that the entomologist may be able to identify them. Soft-bodied larvæ may be sent alive in small tin or wooden boxes with some of the plants they feed upon inclosed, or if dead they may be placed in vials of weak alcohol. All beetles, plant-bugs, and hard-bodied insects may also be placed in alcohol, though the bottle must be protected from breakage, if sent through the mail. Butterflies, moths, &c., may be killed by a slight pinch on the thorax, and may then be sent folded in envelope corners or triangular slips of paper. Where there are a number of these papers they may be conveniently packed in tin or small wooden boxes. All packages should be addressed to the Commissioner of Agriculture, and will then come free by mail if not over two pounds in weight.

It is also hoped that our correspondents will particularly mention what remedies are used in their neighborhood, and with what success, in destroying our most common noxious insects, such as the wheat-fly, Hessian-fly, chinch-bug, army-worm, Colorado potato-beetle, &c. It would also be well for southern planters to make a specialty of report-

ing the success they have met with in applying remedies for the destruction of the cotton-worm or fly, and the boll-worm, or if any means whatever have been used in their neighborhood to destroy them, and what they recommend.

INSECT INJURIES.—In a few localities in Rhode Island and Connecticut our August returns present injuries to oats, sod-corn, and grass crops by the army-worm, (*Leucania unipuncta*,) and the white grub, (larva of *Lachnosterna*,) with the occasional presence, in the fruit, of the canker-worm, (*Anisopteryx vernata*.) In King's County, New York, complaints were made of the cabbage-worm, (probably *Pieris rapæ*.) Cut-worms (a species of *Agrotis*) injured the corn crop in Armstrong and Lycoming counties, Pennsylvania. From Middlesex County, Virginia, come reports of the bud-worm, (a local designation not recognized.) In Mecklenburg County some annoyance was created by the chinch-bug. [*Micropus* (*Rhyparochromus*) *leucopterus*.]

Extensive injuries to cotton by insects are reported in nearly all the cotton States. North Carolina, however, has been nearly exempt from this infliction, but a single mention of "insects in cotton" coming up from Pasquotank county. The August crops of Richland county, South Carolina, were generally swept by the cotton caterpillar or cotton army-worm, (*Anomis xylinæ*.) In Georgia the ravages of this insect are reported in Lee, Marion, Glynn, Stewart, Clay, Glasscock, Calhoun, Schley, and Baldwin counties. In some places the destruction was complete. In Schley County fields were entirely denuded within forty-eight hours after the appearance of the enemy. In Glasscock and Marion the boll-worm, (*Heliothis armigera*,) added its destructive influence. In some localities the grass caterpillar or grass army-worm, (*Prodenia autumnalis*,) devoured the corn, grass, and pea crops.

In Suwannee County, Florida, cotton caterpillars appeared July 15, and within a month entirely swept many fields. In Leon they appeared August 18, and within a week the last cotton leaf had disappeared. The same report comes from Taylor county. In Jefferson the third brood was in process of incubation. Similar complaints come from Gadsden, Marion, and West Florida generally. The grass caterpillars were numerous and active in Columbia and Manatee.

Our August returns from Alabama foreshadowed an extensive visitation of the cotton caterpillar, which, as our September reports show, was fully and painfully realized. In some places the boll-worm vied with the cotton-worm in its destructive influence. Reports of either or both of these pests come from Macon, Clarke, Pike, Marengo, Conecuh, Perry, Montgomery, Crenshaw, Russell, Fisk, Calhoun, Chambers, Butler, Autauga, Dallas, Wilcox, and Tuscaloosa Counties. In Crenshaw entire fields were denuded of foliage. In Calhoun the crop prospect was reduced 25 per cent. in five days. In Autauga the roads, woods, and wells were full of army and boll worms. In Wilcox the caterpillars, after stripping the cotton plant of its leaves attacked the bolls, eating the smaller ones and killing the larger ones by gnawing around them. In Perry the crop was cut down to half an average after August 20. In Fisk the boll-worm was also destructive in corn-fields.

In Mississippi the injuries reported by our correspondents, though less extensive than in Alabama, were quite considerable. Persistent efforts for the destruction of cotton insects appear to have been measurably successful in several counties. Reports of injuries come from Pike, Jasper, Newton, Clarke, La Fayette, Wilkinson, Warren, Smith, Attala, Lauderdale, Wayne, Hinds, Madison, Neshoba, and Yalabusha.

In some of these counties the damages were slight; in others entire fields were denuded of leaves.

In Louisiana the cotton-caterpillars, after several ominous demonstrations in July, appeared in force in several counties during August. They nearly "finished" the crop in Tangipahoa, and reduced that of Marion to a half average. In Concordia many fields were entirely stripped of foliage. Severe injuries were inflicted in Red River and Saint Landry, while insects in formidable numbers were reported in Cameron, Carroll, Union, Rapides, Avoyelles, Baton Rouge, and Caddo. In Baton Rouge they were very annoying to peach and grape growers. In Orleans County truck-farmers suffered from the ravages of a large black grasshopper, (*Romalia microptera.*) This insect has been known for forty years, appearing in May along the South Atlantic and Gulf coast. Heretofore it has been comparatively harmless, but this year it was very injurious to melons and vegetables. It also climbed peach and fig trees to devour the fruit. It cannot fly, its wings being too short.

In Texas serious damages to the cotton crop are reported in Austin, Gonzales, Atascosa, Matagorda, Milam, and Blanco Counties by cotton-caterpillars, grasshoppers, and an undescribed insect. In Gonzales County grasshoppers also inflicted great injury upon bottom crops of corn.

In Jefferson County, Kentucky, pears suffered from the depredations of the locust, (*Cicada septendecem.*)

In several counties north of the Ohio River the Colorado potato-beetle (*Doryphora decemlineata*) was quite active. In some cases its depredations were serious, while in others they were successfully resisted by remedies. Infusions of Paris-green, dog-fennel, and May-weed are reported as quite effective in different places. The general opinion appears to be that these insects were not nearly so numerous or destructive as in former years. Similar reports come from Minnesota, Iowa, and Missouri. In Pulaski County, Missouri, the disappearance of the beetle is attributed to the destruction of its eggs by the lady-bug, (*Coccinella,*) which appeared in great numbers. In Nebraska the Colorado beetle was more annoying, its ravages being quite severe in several counties. In Boone County the "old black potato-bug, enlarged and improved," was quite a nuisance. This was, probably, the *Macrobasis albida*, specimens of which have been received by the Department, with the statement that they devour not only potatoes, but several other vegetables. From the same locality come reports of a large round beetle, with faint stripes along its dusky back, which has been very destructive. The terms of description suit several destructive insects, and hence are insufficient to identify the one in question. In Republic County, Kansas, the "old-fashioned" potato-bug (*Cantharis cinerea*) greatly injured potatoes and beets. The Colorado beetle was also annoying in Helena County, Montana. In Iron County, Utah, potatoes, beets, and corn were destroyed, to a considerable extent, by a dark-green worm, an inch and a half in length, not yet identified. Our correspondent says that the ground was literally covered with these worms.

The chinch-bug did some damage to Australian wheat in Pulaski County, Indiana. In Kankakee County, Illinois, it seriously damaged corn and oats. It was also quite destructive in Mahaska, Marion, and Lucas Counties, Iowa, and inflicted greater or less injuries in Harrison, Nodaway, Crawford, Washington, Jefferson, Moniteau, Sullivan, Reynolds, and Phelps Counties, Missouri. In Wilson and Jefferson Counties, Kansas, this bug was very destructive on wheat, especially the

white Australian. In Sage County, Nebraska, its ravages are also reported.

The army-worm injured the cereal crops considerably in Grundy and Livingston Counties, Illinois. In Jefferson County, Iowa, it devoured the meadows. Its mischievous presence was also felt in Hall County, Nebraska.

In Lucas County, Iowa, grape-vines were much injured by an insect which, from imperfect description, is supposed to be the *Bostricus bicaudatus*. Specimens of this insect have been sent from this locality to the Department, with statements of its habit of injuring grape-vines by boring into the wood.

West of the Missouri River grasshoppers (*Caloptenus spretus*) were quite mischievous in some localities. In Ottawa County, Kansas, they appeared August 15, and for three days wrought havoc in the corn. They did great mischief, also, in Madison and L'eau-qui-court Counties, Nebraska. In Bonhomme County, Dakota, they appeared August 10, and remained two days, partially destroying the corn crops. In Morgan County, Utah, they were so numerous as to prevent the sowing of buckwheat. In Columbia County, Oregon, they made great havoc of grass and grain crops, scarcely leaving a trace of clover, and then attacked gardens and fruit-trees.

CHEMICAL MEMORANDA.

By Ryland T. Brown, Chemist.

Laboratory Work.—The laboratory, since the last report, has been engaged chiefly in the investigation of marls, the first section of which investigation we have already reported. The analyses here presented may be regarded as a fair average of the shell and green-sand marls of the Atlantic border, not including, however, the phosphatic beds of South Carolina. It will be observed that while these marls are generally rich in lime and contain a fair proportion of phosphates and alkalies, yet they are deficient in organic matter, or the means of furnishing the nitrogenous materials of plant food. In soils where the exhaustion has not extended to the organic matter, or where the vegetable mold has been well maintained by turning under clover or other green crops, these marls will supply all the demands of growing vegetation under ordinary circumstances. But where these conditions are wanting, the marls will disappoint the farmer who depends on them alone. It will always be safe to use them in conjunction with stable manure or some other nitrogenized fertilizer. The lime in these compounds exists chiefly as a carbonate, and where the per cent. of this mineral is high the marl will be rendered more active by being burned; but the economy of burning marl at any place will depend on the price of fuel.

Two samples of marl from Prince George County, Maryland, furnished by Frederick W. Poor, gave on analysis the following results:

No. I.—*Shell marl.*

Moisture	2.600
Lime	32.910
Carbonic acid	26.429
Iron and alumina	4.160
Silica	33.901

Phosphoric acid	Trace.
Magnesia	Trace.
Potassa	Trace.
	100.000

No. II.—*Green-sand marl.*

Moisture	4.025
Lime	7.260
Carbonic acid	5.452
Iron and alumina	3.950
Phosphoric acid	0.250
Alkalies	0.700
Silica	78.363
Magnesia	Trace.
	100.000

A specimen of lime marl (*Calcareous tufa*) from Charles G. Thomas, San José, Santa Clara County, California, on analysis gives the following results:

Moisture	1.500
Carbonate of lime	58.360
Iron and alumina	7.495
Alkalies	0.250
Phosphoric acid	Trace.
Silica	32.910
	100.000

A specimen of gypsiferous marl from D. E. Coon, Selma, Alabama, is composed of—

Calcium sulphate, (gypsum)	22.355
Silica and alumina	60.205
Moisture	17.440
	100.000

A commercial fertilizer, under the name of "Clark's ammoniated bone," manufactured in Philadelphia, gives on analysis the following results:

Moisture, (determined at 100° C.)	6.2000
Organic matter	37.6500
Soluble phosphoric acid	8.6670
Insoluble phosphoric acid	8.0787
Lime	19.2696
Sulphuric acid	4.9648
Alkalies	0.5000
Silica and other insoluble substances	14.6699
	100.0000

Hon. W. Hunter, Second Assistant Secretary of State, sends to the Department of Agriculture a dispatch (No. 61) from the United States vice-consul at El Paso del Norte, Mexico, with the specimens of alkali described in the dispatch. We append an extract from the communication of Mr. Pierson, the vice-consul, which gives a clear idea of the location and extent of this singular deposit:

* * * There is a large basin, or quantity of low, flat, and damp land, containing about 5,000 acres, situated in the state of Chihuahua, one hundred and fifty miles distant and southward from this city, in parallel 31, near Lake Guzman, which produces these pearls; for the specimens clearly resemble the pearls made from the black

potash of the Northern States. This pearl pan or lake is known in this country as Alkali Lake. There appears to be an underground deposit of alkali which is constantly rising to the surface in a kind of gas or vapor which crystallizes on the surface of the ground in one continuous and complete crust over the whole pan, in a thickness ranging from ¼ to 1¼ inches. The Mexicans use it for the manufacture of bar-soap, which is far superior to any rosin or common bar-soap of the United States. When this crust is taken off the ground another complete crust forms in a week; and thus it appears that fifty-two crops or gatherings may be made during the year, and thousands of pounds can be obtained at one time. * * * A Mexican arrived in this city yesterday with a load of these pearls, containing 16 fanegas, (equal to 2½ English bushels per fanega,) and sold the same to Ernest Augustine, merchant, for the purpose of making soap, for the sum of $1.25 per fanega; and from which I gathered these specimens. If the Department will have them analyzed, I shall be pleased to know the true nature of these pearls.

The specimens were averaged and a sample submitted to analysis with the following results:

Moisture	3.8163
Potassium sulphate	1.3000
Sodium sulphate	11.4948
Sodium chloride	5.0967
Sodium carbonate	7.3915
Sodium bicarbonate	70.9002
	100.000

From the above it will be seen that this is substantially a group of sodium salts, consisting chiefly of bicarbonate. The potassa, after subtracting the sulphuric acid with which it is united, amounts to less than 1 per cent.

NOTES FROM FOREIGN JOURNALS.—*Soil temperature.*—M. Becquerel, in his experiments with the electric thermometer, has found that calcareous and siliceous soils absorb and retain more heat than argillaceous and humid soils, and that the temperature of the air above the former is diminished while it is rising to its highest point, but above the argillaceous soil it is increased. These conditions are reversed when the soils are diminishing in temperature.

The practical inference from this is that vegetables liable to be injured by frost should be planted on calcareous or siliceous soils, for the danger of frost-injury is during the hours when the soil is losing heat. If, however, it is desirable to raise such vegetables on moist clay soils, they should be protected from the cooling action of the earth.

Influence of vegetable mold on soils.—M. Schlœsing concludes, as the result of his investigations, that vegetable mold acts favorably on all qualities of soils. On loose sandy soils, vegetable mold has a tendency to consolidate the particles and render the soil more compact and consequently more retentive of moisture and the fertilizing gases. On the other hand, stiff, compact soils are rendered friable and mellow by a mixture with vegetable mold. The improvement in the mechanical condition of the soil may be regarded as chief effect of vegetable mold.

Utilization of sawdust.—M. Gustave Huezé says that, though sawdust decomposes very slowly, yet it may be economically used as litter in stables, and left for several months in contact with the solid and liquid excrement of animals, which it readily absorbs. It may also be composted with quick-lime and left in a heap for about a year. Additions may be made to this heap from time to time, but, when such additions are made, the whole heap should be well stirred. It will be improved by being frequently saturated with urine or sewer-water. Sawdust thus treated may be used on partially exhausted soils with great advantage.

Assimilation of crops.—M. Isidore Pierre has given to the public, in a tabulated form, the result of an extended series of experiments made for the purpose of determining the progress of assimilation during the growth of crops. The objective points of the experiments are thus stated:

First. At what stage in the life of the plant do fertilizers act most effectually in furnishing them the different parts of their substance and at what stage does this action practically cease?

Secondly. At what stage of its growth does a plant cease to take from the soil, either wholly or in part, the elements which enter into its composition, and when is it most exhausting to the soil?

The discussion is given at length in the June number of the Journal d'Agriculture Pratique, and contains much of interest. We can give only the tables exhibiting the results, from which our readers can make their own inferences. Tables Nos. 1 and 2 refer to crops of wheat, and the experiments were made in different years. No. 3 refers to a crop of colza, and is of value to the American farmer only as illustrating a general principle, as the crop is not raised in this country. The figures refer to kilograms, per hectare, but, as the reference is really to proportions, the reader may call them parts of any measurement he chooses.

TABLE No. 1.

	April 9.	May 16.	June 13.	June 29.	July 15.	July 30.
Organic matter, deducting nitrogen	888.0	2141.1	4962.5	6083.0	6520.9	6500.5
Nitrogen	35.8	57.8	72.6	73.2	68.7	67.8
Silica	25.2	67.2	153.7	192.0	203.8	206.6
Oxide of iron	1.3	9.3	14.2	20.5	14.8	15.8
Phosphoric acid	7.2	13.5	16.7	18.3	17.4	18.3
Lime	14.8	26.1	37.6	38.0	40.3	32.3
Magnesia	2.7	6.3	7.4	8.0	7.0	7.5
Potassa	16.3	22.6	37.2	42.7	33.2	32.7
Soda	3.9	4.2	8.2	9.7	9.5	5.2
Total	955.2	2348.1	5310.1	6485.4	6915.6	6897.7

TABLE No. 2.

	May 11.	June 3.	June 22.	July 6.	July 25.
Organic matter, deducting nitrogen	1230.3	2787.8	5309.1	5743.3	5731.6
Nitrogen	50.9	52.1	89.9	84.6	78.6
Silica	35.3	67.3	127.8	104.0	108.8
Oxide of iron	5.6	5.2	6.9	6.9	5.9
Phosphoric acid	9.8	11.9	18.7	17.7	16.2
Lime	17.5	21.7	31.3	28.6	23.8
Magnesia	3.5	3.7	7.5	6.7	7.5
Potassa	22.0	23.4	27.0	27.9	23.5
Soda	13.8	21.0	24.5	26.6	14.8
Total	1397.7	2994.1	5642.7	6040.3	6010.7

TABLE No. 3.

	March 23.	April 2.	May 6.	June 6.	July 20.
Entire crop	2896.0	3393.0	7172.0	8085.0	8005.0
Mineral matter, (ashes)	338.7	393.3	853.9	806.9	578.1
Nitrogen	77.6	82.4	121.7	116.7	111.1
Phosphoric acid	30.8	37.0	73.0	73.6	78.1
Lime	95.6	112.2	259.9	255.0	175.9
Magnesia and alkaline salts	139.3	152.3	159.9	213.3	209.6

It will be seen from the above tables that, at the period of blooming, plants have reached their maximum in the appropriation of nitrogen, iron, phosphoric acid, potassa, magnesia, and soda, and that silica is increased during the period of ripening, and lime also (as shown in the first table) appears to increase until within fifteen days of maturity. This is what might be expected, for at that period the straw is becoming more solid by the thickening of its enamel, which is composed chiefly of silicate of lime.

Another curious fact, which these experiments teach, is that not only does the plant cease to appropriate mineral elements (except silica) in the last thirty days of its growth, but that it actually returns to the soil, as unnecessary for its purposes, a considerable portion of that which has already been absorbed. A crop removed at the period of flowering will take more from the soil than it would if permitted to ripen fully before cutting.

SCIENTIFIC NOTES.—*Increased consumption of sugar.*—Though the manufacture of sugar was commenced in the West Indies early in the sixteenth century, yet its use in domestic economy did not become general in Europe or America before the beginning of the last century. In the year 1700, only 10,000 tons were used in Great Britain, though the English were at that time the leading manufacturers of sugar. The consumption of sugar in the British Islands in the year 1870 is stated at 600,000 tons. In this country the consumption of sugar is steadily increasing. Since the close of the late war, the ratio of increase has been about 10 per cent. annually, and in the year 1871 the sugar consumed in the United States amounted to 700,000 tons, an increase of 15 per cent. on the preceding year. This is the largest consumption of sugar, in proportion to the population, found in any nation on the globe. A very small proportion of the sugar consumed in the United States is produced within our own territory, while in Europe the production of sugar is rapidly increasing and bids fair soon to render the principal nations of that quarter independent of the tropical regions in regard to the supply of sugar. Since the year 1850, the production of sugar from beets in France has risen from 60,000 tons to 300,000; in Austria, from 10,000 to 80,000 tons; and Russia, where beet-culture was introduced since 1850, now produces 100,000 tons of sugar. The increased consumption of sugar may be taken as the evidence of an advance toward a higher civilization.

Respiration of fishes.—N. Grehaut (Comptes-rendus, lxxvi, 621) reports a series of experiments on the breathing of fishes, important, as being in the line of those of Humboldt on the same subject, and reaching results, in some respects, at variance with his. Grehaut reports that fishes give off a volume of carbonic acid (anhydride) equal to the volume of oxygen exhaled. Humbolt states it at only four-fifths of this. Again, Grehaut affirms that nitrogen is increased in the air exhaled, while Humboldt reports it as diminished. We are not told, however, that the experiments were made on the same kind of fishes and under similar circumstances.

These experiments prove that fishes can remove the whole of the oxygen dissolved in water and can even deprive arterial blood of its oxygen when the same is mixed with the water which the fish inhales. The writer regards this fact as of importance in general physiology, as illustrating the mode in which oxygenation of the blood is effected in the mammalian fetus, through the maternal placenta.

Bismuth.—Reports reach us of the discovery of a very promising mine of this metal in Utah, at a place called Beaver, about two hundred miles south of Salt Lake City. If these reports prove true, the discovery may be regarded as one of great importance to the arts. Bismuth has heretofore been ranked among the rare metals, and its use has been limited on this account. A single mine at Schneeburg, in Saxony, furnishes the greater part of the bismuth used in the arts, and this mine is said to be nearly exhausted. Bismuth, in limited quantities, is found in a few other localities in the Erzgebirge range of mountains; it also occurs, associated with other metals, at Cornwall and Cumberland, England; at Monroe, Connecticut, and at Brewer's mine, in Chesterfield District, South Carolina. If the Utah mine shall prove as rich as present reports indicate, bismuth will be introduced into many processes in the arts where cheaper substitutes have been used heretofore. Bismuth is a hard, brittle metal, of a reddish-white color. It fuses at 507° F., and on cooling expands more than any other metal. An alloy of two parts of bismuth, one of lead and one of tin melts at the boiling-point of water. In the mines of Saxony it is found in the form of native metal.

Milk.—Professor Law, of Cornell University, publishes in the Lens some interesting observations on living organisms in milk. Two specimens were placed under the microscope after twelve hours' exposure. The appearance exhibited is described as "an abnormal adhesiveness of the oil globules, which had accumulated in dense masses instead of remaining apart, as in healthy milk. Intermixed with the globules were dark-colored spherical bodies of a much larger size, spores, and filaments. On examination of the water drunk by the cows, it was found to contain numerous spores of low forms of vegetable life. The cows yielding the morbid milk appeared in health so far as appetite, rumination, pulse, breathing, and state of skin were concerned, but the temperature was higher than usual, and, on microscopial examination of the blood, it was found to contain certain ovoid bodies of at least double the size of the ordinary blood-globules. Upon withholding the water, the impurity of the milk at once disappeared. The chain of evidence now appeared complete. The water contained vegetable spores which developed into a luxuriant growth of mycelium when the milk was allowed to stand." The plain inference from all this is the great importance of furnishing cattle pure water to drink, if we expect healthy milk from them.

Eucalyptus globulus.—This Australian plant, or rather tree, known by the common name of Blue Gum, has been introduced into some of the Southern States and appears to be well adapted to the climate. The whole plant—leaves, bark, wood, and root—is pervaded by a peculiar aromatic, bitter principle, and a pungent volatile oil has been distilled from the leaves. To this oil the name of "eucalyptol" has been given. The leaves and bark of this tree have attained a high reputation among the natives of Australia for the cure of malarious diseases. Lately we observe that Doctor Coleman, resident physician at the United States marine hospital at San Francisco, California, has used it in the treatment of fevers with marked success. He administered it in the form of a fluid extract, prepared by his directions. Coming from this source, the statement may be regarded as altogether reliable. Dr. Coleman treated five cases of remittant fever, nineteen of chills and fever, and nine of typhoid fever with the fluid extract of eucalyptus and reports satisfactory results in every case. He treated a number of other diseases with this remedy, where it appeared to be indicated, and the result was various, curing many cases and improving most. The active principle is said to

possess great power in preventing confervoid growths in fluids. In this it much resembles quinine, for which it is proposed as a substitute.

Printing on cloth.—M. Vail (Comptes-rendus, June 10, 1872) proposes a new method of printing on cloth. It is known that when a solution of nitrate of silver is brought into contact with copper or zinc, silver in the metallic form is precipitated in a very fine state of division. If the cloth to be printed be moistened with a weak solution of nitrate of silver and impressed with clean-faced types of copper or zinc, and the fabric immediately washed in soft water, a clear and sharply defined impression will remain and will resist the action of acids, alkalies, or soaps. The color of the impression may be varied, according to the strength of the solution, from a light gray to a deep black.

Aluminium coins.—French authorities state that the government, on the recommendation of a scientific commission, has ordered experiments to be made on the propriety and practicability of substituting an alloy of aluminium for the bronze now used in coins. Aluminium has many properties which adapt it well to the purpose of coinage, and some of its alloys are very beautiful.

Cooking-utensils made of copper are lighter and more convenient than those made of iron, but the poisonous character of all the compounds of copper, liable to be formed in the use of such vessels, is a serious objection to them. Copper vessels may be rendered perfectly safe by coating them in the following manner: Take twelve parts of fluor spar and as much unburnt gypsum, and add one part of powdered borax. Fuse this mixture in a crucible. Pour the fused mass out, and after it has cooled grind it fine with water, so as to form a thin paste, with which the inside of the copper vessel is to be painted. After this the vessel is set away in a warm place till the paint is dry. When it is thoroughly dry, the vessels are baked in an oven till the coating is fused. On cooling, the vessel will be found coated with a smooth, white, opaque enamel, which adheres strongly to the copper and protects it from the action of all the vegetable acids.

Nitrate of ammonia in respiration.—M. Struve, by a series of well-conducted experiments, has detected nitrate of ammonia in the water exhaled from healthy lungs in breathing. From this he concludes that the nitrogen of the air we breathe is not entirely passive in the process of respiration, as physiologists have heretofore supposed.

Production of ozone in the air.—A series of very interesting experiments have been made at Kissingen which prove conclusively that ozone is formed during the evaporation of water. Great care was taken in these experiments to avoid such tests as might mislead the experimenter regarding the true character of the active principle formed. Led by the light of these experiments, we must infer that the air on the ocean is richer in ozone than the air of inland places. Observations made on the island of Texel confirm this view.

Paper lamp-shades.—Dr. Mirus *(Polytechnisches Notizblatt)* mentions two cases in Jena and one in Frankfort where persons using green glazed paper lamp-shades were poisoned by the arsenic of the coloring matter. The heat of the lamp volatilized the arsenic, and rendered the small quantity present very dangerous. In rooms properly ventilated green lamp-shades may be harmless, but in close rooms such shades should be avoided.

Non-inflammable fabrics.—Cotton or linen goods may be rendered

non-inflammable by being dipped in a solution of equal parts of acetate of lime and chloride of calcium dissolved in twice their weight of water.

Chromium steel.—A patent was obtained some time since, by Mr. Bauer, for the production of steel, in which a part, or the whole, of the carbon of common steel is replaced by metallic chromium. It is claimed for this variety of steel that it is capable of sustaining, without injury, a higher heat than ordinary steel, and is less liable to become oxidized or "burnt" in working. It is said to work quite as easily, and to give a much smoother surface when rolled than common steel. From the report of Captain Eads, chief engineer of the Saint Louis bridge, we learn that this steel has been employed in those parts of the bridge where great strength is required, and that it has given entire satisfaction, even where bolts of the best cast steel had failed.

Progress of chemistry.—One by one the organic products are being copied in the laboratory. The last triumph in this direction which has come to our notice is the production of glycerine by Friedel and Silva. If the vapor of fusel oil be passed through a red-hot tube, propylen is formed, which readily combines with chlorine, and from this chloride of propylen glycerine is produced by a process in which no glycerine is employed. As glycerine is the base of all true fats, this is an important step in the direction of oil making.

Chloralum.—Professor Fleck reports to the government of Saxony a series of experiments with a disinfectant bearing the above title, manufactured by the "Chloralum Company" in London. It is sold in the fluid form put up in neatly-labeled vessels, each containing 637 grams, (17.82 fluid ounces,) costing 15 groschens, (37½ cents;) or in the form of a white powder put up in tin boxes, each containing 370 grams, (7.39 ounces,) at 5 groschens (12½ cents) per box.

Dr. Fleck ascertained that the fluid consisted of—

Water	82.32
Chloride of lead	0.15
Cloride of copper	0.10
Chloride of aluminum	13.90
Chloride of iron	0.42
Chloride of lime	3.11
Total	100.00

The powder had substantially the same composition with the addition of 32.15 of uncombined clay and sand. The process of manufacture is reported at follows: "A calcareous clay containing but little iron is dissolved, as far as possible, in fuming hydrochloric acid. The clear concentrated liquid above the undissolved clay is drawn off in bottles, and sold as 'Chloralum.' The residue, with the liquid adhering, is evaporated to dryness in leaden pans, and put up in boxes to be sold as 'chloralum powder.'" Its powers as a disinfectant were carefully examined by Dr. Fleck, and reported in the following language:

In order to test the importance of chloralum as a disinfectant, equal volumes of sewage were treated with chloralum, chloride of lime, alum, sulphate of iron, quicklime, and chloride of magnesium, and the impurities remaining in the clarified solution determined with the alkaline silver preparation. The result is given in a tabular form, the effect of chloride of lime being assumed as the standard.

Chloride of lime	100.00
Caustic lime	84.00
Alum, (sulphate of alumina and potassa)	80.40
Sulphate of iron	70.70
Chloralum	74.00
Chloride of magnesium	57.00

Chloralum may be cheaply produced by the action of hydrochloric acid on clay, but it is inferior in disinfecting power to several other chlorides and sulphates which may be produced very cheaply. Chloralum is no way related to the newly-introduced drug chloral hydrate. It very properly derives its name from its chief ingredient—chloride of aluminum—chlor-alum.

Wastes of cities.—How to remove the constantly accumulating filth of cities, and thus relieve them from a fruitful source of disease, and how to utilize this waste so as to restore to the agricultural interest the fertilizing elements of which it is perpetually robbed, are questions of the first magnitude, and questions which are earnestly pressing on this age and demanding an early solution. Modern cities have generally followed the example of Rome in disposing of their garbage and excretæ through a system of subterranean sewers. This system makes no pretension toward economising these wastes, and the efforts which have recently been made in this direction, whether by using the sewage for irrigation or by precipitating its solid matter, have practically been but little better than failures. In a sanitary point of view, the whole system of disposing of offal by sewers is sadly defective. The offensive matter is put out of sight, it is true, but the gases arising from it pervade the whole atmosphere of the sewer, and most of these being lighter than air escape at every man-hole or other opening along the line of the sewer; and if these be secured, still, in the warm, dry months of summer, the bricks, of which the sewers are usually constructed, and the earth above them become easily permeable to gases and allow these to escape readily.

During the prevalence of contagious diseases in cities, if the excretæ of patients be thrown into the sewers, these become a most effectual means of propagating and perpetuating disease. Sewers, as a means of carrying off accumulations of surface-water and the wastes from hydrants are indispensable; but the health of cities and the interests of agriculture alike demand that the perishable wastes of cities be disposed of in some manner less objectionable. This demand, however, has not been successfully met up to the present time, but if we may judge from the energetic efforts being made in this direction, the prospects of a favorable solution of the problem are altogether hopeful.

This Department is in receipt of a communication from James Alexander Manning, of London, England, in which he gives the general outlines of his method of disposing of the wastes of cities, which he assures us is in successful operation at the English capital. If the report of his operations is reliable, (and we have no reason to doubt his statements,) the improvement is of incalculable importance, both in its sanitary and agricultural aspects. The system of sewers prevailing in most of our American cities is not well adapted to the introduction of Mr. Manning's method, and would, probably, prove a formidable obstacle to its general adoption.

We present a description of Mr. Manning's process in his own language:

I will now, as briefly as possible, explain the nature of my process, by which it will be perceived that no portion of the fertilizing elements of night-soil can be lost in the collection or manufacture of the manure, or in any of the operations to which they are subjected, as the excretæ are completely deodorized and disinfected in the cesspits or other receptacles devoted to that service; are removed in hermetically-closed carts, are discharged into hermetically-closed evaporating chambers and evaporated to dryness, the deleterious gases, the soot and gaseous products of the coal employed in the manufacture, together with the vapors from the liquid portion of the fecal matter, being all drawn off from the evaporating-chamber by means of a powerful exhaust

and discharge fan, which is made to rotate with great velocity by means of a powerful steam-engine.

The mode of collecting the deodorized and disinfected contents of the cess-pits or other receptacles of fecal matter must depend in some measure on circumstances, the barometric system being preferred, by which, in half an hour, the work of the greater part of a night under the old bucket system, is effected without noise, dirt, or bad odor of any nature, and, under proper regulations, without the slightest disturbance to the inhabitants. When the iron cylinder, or barrel-cart, with the pump and hose, cannot be conveniently employed, equally effective measures will be adopted to prevent the possibility of nuisance. As soon as a cess-pit is emptied, such chemicals are introduced into the empty pit as will effectually prevent the fermentation of the urine, which generally commences within a few hours after its deposition, and will entirely fix the ammonia, and retain it until the pit will require to be re-emptied. The fermentation of the urine converts all the different forms of the ammonia contained in the solid and fluid excretæ into carbonate of ammonia, which, being of the most volatile nature, has hitherto escaped so rapidly from the pits into the air, to the great detriment of the public health and loss to agriculture, that in less than one year it has been found that at least 50 per cent. of that valuable salt has been liberated; but under the operation of my process the whole of the ammonia will be preserved for the benefit of agriculture. The carts are then drawn to the works, which should be erected at such a distance from the town as not to offend the most delicate susceptibilities, though, in fact, nuisance of any nature is rendered absolutely impossible, every operation, from the collection of the raw material to the packing of the manure in bags for the market, being conducted in hermetically-closed vessels. The excretæ are then discharged into large fire-brick evaporating-chambers, from 30 to 60 feet in length, or longer, if necessary; 6 feet wide and 5 feet 10 inches high. * * * The evaporation of the excretæ to dryness is effected by means of one or more furnaces or fires, so arranged that the heat shall pass under, up the sides, and inside, under the arched roof of the chambers, and over the surface of the liquid to be evaporated, all the soot and gaseous products of the coal employed in the manufacture of the manure being drawn over the surface with great rapidity, in combination with the vapors from the fluid portion of the excretæ, by means of a powerful exhaust and discharge fan, as before stated, which is made to rotate with great velocity by means of a steam engine, so as to supersede the necessity of a chimney-shaft, and keep all the gases and vapors under perfect control, and prevent them from coming in contact with the atmosphere. The vapors and gases are then conducted or discharged with considerable force into a large iron receiving-tank, surrounded by water for the condensation of the vapors, when the carbureted hydrogen gas and the atmospheric air pass off by an ascension-pipe on the top of the receiver into a gasometer, or otherwise, for further treatment, as may be deemed necessary, the ammoniacal gases from the coal consumed in all the operations of the factory, being conducted into the same receiving-tank, are retained therein, and form with the water of condensation a weak solution of ammonia, commonly called ammoniacal liquor, which is subsequently drawn off into a large cast-iron still, and converted, in the ordinary manner, into sulphate of ammonia, which is added to the manure to increase the percentage of that salt therein, or may be sold separately as an article of commerce.

Having thus shown that all the operations of the factory are conducted in hermetically closed vessels, and that nuisance from the emanation of bad odors or mephitic gases of any kind is rendered impossible, I will only further observe on this part of the subject, that all the details of construction, furnaces, dampers, flues, steam-pipes, &c., being accurately set forth in the drawings and the diagrams submitted for examination, it is unnecessary here to enter into any minute description of their details, as it will suffice to state that ample provision is made for all possible contingencies, such as the continuous agitation of the excretæ by steam power during the rapid evaporation of its liquid portion—the introduction of a jet of steam, through the hollow shaft of the agitator—into the evaporating chamber at the commencement and again toward the conclusion of the operation, to prevent injury to the agitator, &c., until the vapors arise, as well as shutting off the fire by means of dampers from under the invert of the chamber at a certain point of the operation, and passing it entirely over the surface of the nearly dry sediment, but under the crown of the arched roof, to prevent the charring thereof, and the consequent deterioration of the manure. The dry sediment or manure is then removed by long scrapers, or other suitable means, into the cooling chamber, which is constructed with a cupola roof, the top of which is furnished with a small exhaust-fan for carrying off the heated air, the cooling being further expedited by the admixture, in suitable proportions with the hot dry sediment, of the cold ash products or charcoal obtained either by the simple incineration or by the conversion in closed ovens or kilns of the waste animal and vegetable substances of the district or locality in which the process may be established, so that, whatever may be the nature of the wastes, they may be utilized for agriculture and the improved sanitary condition of the locality.

By these means manures are produced containing all the organic and inorganic constituents indispensable to the structure and development of plants, with such a percentage of ammonia as would enable it to compete with guano even if that valuable manure were not, as it unfortunately is, now nearly exhausted. I may observe that in the instance of some waste substances of vegetable origin, purchasable at a small cost for conversion into manure, and which are known to contain a considerable percentage of ammonia, phosphoric acid, &c., instead of incineration, or conversion into charcoal, they will be dissolved by sulphuric acid, in order to retain the ammonia; and to increase the percentage of soluble phosphate—the phosphates contained in fecal matters not being considered sufficient for the cultivation of turnips or root crops in general by the scientific farmers of the age—a sufficient quantity of bone-dust will be mixed with the excreta in the evaporating-chamber at each operation, which, by the action of the acid and other chemical substances applied thereto for the retention of the ammonia, will convert the bone-dust during the operation into soluble phosphate of lime, without any other treatment.

BOTANICAL NOTES.

By George Vasey, Botanist.

Forest-tree culture.—Unquestionably one of the most important questions engaging the attention of the American people is that of forest culture. The demands of our rapidly growing country have for many years so drawn upon the resources of our native forests, which at one time seemed inexhaustible, that we must now contemplate their early extirpation, and address ourselves to the task of conserving what forests we have remaining and providing new sources of supply.

Much has been written on this subject, but so difficult is it for us to realize the bearing of remote evils that comparatively very few farmers or land-owners have yet seriously engaged in the work of replenishing their woodlands. The arguments for this work are strong and numerous, and have been cogently presented by many writers. Many facts have been observed which appear to show that the presence of forests has much to do with the climate and rain-fall of a country; thus, it is said that the extreme dryness of Spain is due to the absence of trees; that many districts in France have been materially injured by denudation; that Palestine and many other parts of Asia and northern Africa, which in ancient times were the granaries of the world, are now deserts or infertile regions, in consequence of the loss of their forests. It is also stated that a beneficial change in climate and rain-fall has in several instances followed the introduction of trees and plantations in regions that were formerly destitute of them. Thus it is said that in Lower Egypt, where anciently rain never fell, the introduction and cultivation of extensive plantations have been attended with the fall of a good deal of rain, so that showers are no rarity even at Cairo. It is also affirmed that, in New England and other wooded sections, the clearing up of forests and cultivation of the soil have had the effect of causing the drying up of many springs and small streams.

There are some who doubt the correctness of these conclusions with respect to the climatic influences of forests, but, as these influences must be of very gradual operation and require observations over a long series of years, the question may be considered open for future inquiry.

But leaving that question out of view there remain abundant reasons to stimulate every land-holder in our vast prairie-regions to give practical attention to the subject.

Trees are wanted for their fruits, for their shade and protection from

winds, for ornament, for fuel, for use in building, fencing, and the mechanical arts. Some trees are adapted to one of these purposes and some to another.

The earliest tree-want which is appreciated by farmers in a new country is the want of fruit-trees. Even this practical and personal need too often fails to stimulate the farmer to immediate action toward the formation of an orchard. But it is not with reference to the cultivation of fruit-trees that we now design to write.

What kinds of forest-trees shall we attempt to cultivate? is a question often asked, toward the solution of which we propose to offer a few thoughts. In an open prairie-region there is an immediate and urgent want of trees for shelter and wind-breaks. Both man and the domestic animals instinctively seek the grateful shade of trees during the intense heat of summer, and as instinctively seek their shelter from the fierce winds of winter. The intelligent farmer also knows that it is a question of positive economy, as the absence of suitable shelter must be represented by an increased consumption of food and fuel. Often, too, he finds that without some suitable wind-breaks he is unable successfully to cultivate the best varieties of fruit-trees. He wishes to secure these advantages of shade and shelter at the earliest possible period, and hence he inquires for rapidly growing trees for cultivation. The great cost of fencing on the prairie leads him to seek some suitable tree or shrub for the growth of hedges. It is true that many experiments in this direction have been attended with failure, but we should not be deterred from continuing our experiments until a suitable hedge-plant is found for every section of country. If the Osage orange fails, let us try the honey-locust, or some of our native thorn-bushes, crab-apples, wild plums, viburnums, or other shrubs or trees, until we meet with success.

The production of wood for fuel and for mechanical uses is an object which, however desirable, has seemed so remote in prospect that it has been almost universally neglected. But even this neglect is to a great extent based upon too general and vague views as to the slowness of tree-growth.

There are several species of trees which with proper cultivation will acquire a circumference at the trunk of eight to ten inches in five years' growth, and a few acres of such trees would soon furnish a constant supply of desirable fuel to farmers who now have to haul, at great expense of time and labor, a distance of from five to ten miles. Most of the rapidly growing trees produce soft wood which is not much esteemed for fuel, but for summer use, when properly prepared, it must be equal, if not superior, to the corn-cobs which are extensively used for fuel in the Western States. Many western farmers have cultivated their prairie-lands for twenty years and have hauled their fuel from a distance, when during that time cottonwood trees of 2 feet diameter, white maple of 18 inches, box-elder of 20 inches, and butternut of 18 inches, might have grown upon their own lands with a little labor and care.

The planting and cultivation of hard-wood trees suitable for building purposes and use in the mechanical arts is one which has been almost wholly neglected in this country. It is a work which is too commonly regarded as being wholly for the benefit of posterity, and we are slow to realize that we have any duties in that direction. But the necessity of entering upon this work is apparent, for it is not difficult to contemplate the period when our natural forests shall have disappeared under the enormous demands which the progress of our country makes upon

them. Some of the trees which at the present time seem most deserving of trial for the purposes we have named we will briefly notice.

Cottonwood.—In the Western States and Territories the name "cottonwood" is applied to the *Populus monilifera*. Groves of this tree are common on the streams which traverse the great plains. Near the base of the Rocky Mountains, however, as in the Platte bottoms near Denver, two other species of poplar are associated with it in the cottonwood groves, viz, the narrow-leaved cottonwood (*Populus angustifolia*) and the balsam poplar (*Populus balsamifera*). They are all large trees, of rapid and vigorous growth, and are readily propagated from cuttings. They are particularly recommended for wind-breaks and shelter for more tender and slow-growing trees. A belt of cottonwoods around a young orchard will undoubtedly save many trees from loss by frosts, and contribute to their thrift and productiveness. All the poplars are dicœcious and objectionable for planting in the immediate vicinity of dwellings on account of the abundant cottony down of the seeds, which fills the air after their maturity. This inconvenience can be avoided, however, by propagating from cuttings of the male tree only.

The maples.—For ornamental culture, for usefulness of wood, and for vigor of growth, there are few trees so worthy of attention as the silver-leaved, or white, and the red, or swamp maple. In the Western States the red maple is comparatively rare. The white helps to diversify the forest growth on the bottom-lands of most of the western rivers, and is largely planted as a shade-tree in the cities. Perhaps the most serious objection to its cultivation is that its long, slim branches are liable to be broken by storms of sleet and snow. This difficulty could probably be obviated by a judicious yearly shortening in of the branches. In some parts of the West it has suffered severely from the ravages of a borer, which penetrates the trunk.

The red maple is more compact and somewhat less rapid in its growth, but is deserving of large planting.

Hard maple.—For beauty of form, for its close and compact foliage, for the value of its wood and of its saccharine juice, no cultivator should neglect the sugar-maple. In the whole family of maples, whether native or foreign, this species is without a peer. It is a little shy of transplanting, and for the first few years is of slow growth, but when it is established it is worth many times it cost. Several foreign species of maple are cultivated for ornament and shade in the eastern cities, but they present no advantages over our native ones.

Box-elder, (Negundo aceroides.)—This tree rivals the cottonwood in rapidity of growth, and is deserving of particular attention, combining not only the qualities of rapid growth, of hardiness, of handsome foliage, and a good quality of wood, but having also great promise as a sugar-producing tree. The sugar made from it is not equal in flavor to that from the hard maple, but is yet of an excellent quality. A committee of the Illinois Horticultural Society examined this tree with reference to its value for sugar and reported: 1st. That it produces more sap than the sugar-maple of equal size, half a gallon per day being obtained from a small tree of 3½ inches in diameter and five years old. 2d. That the sap is richer in sugar, the yield of dry sugar averaging two and eighth-tenths per cent. of the weight of the sap. 3d. The sugar produced is in general whiter than that from sugar-maple treated in the same way. These facts should recommend this tree to the early attention of all tree-planters, especially in prairie-regions.

Ailantus.—The ailantus appears to be one of the most promising trees for cultivation in the West. It thrives well even on hard and stony soils. It is a native of China, but has for many years been cultivated in Europe and in this country. It approaches in botanical affinities nearer to the wafer-ash, or hop-tree, than to any other tree of this country. It produces flowers of two kinds, generally on different trees. The male flowers are produced in large panicles, and are of a greenish-yellow color and very disagreeable odor, which circumstance has made it quite unpopular as a shade-tree in cities. This, however, would not be a serious objection to its cultivation as a forest-tree. The wood is hard and fine grained, and well adapted to cabinet-work. It is also good for fuel. In France and Southern Europe it grows to a large size on chalky soils, where few other trees will live. It has been largely planted on the plains of Southern Russia to fix the loose, blowing sands. North of latitude 40° it will probably be too tender for profitable cultivation. It is easily propagated, either from seeds, suckers, or root-cuttings. It was introduced into this country under the name of "Tree of Heaven," and is indeed a beautiful tree when in full foliage.

Ash.—We have five or six native species of ash, all of which are ornamental and useful trees, but two species, the white and the blue, are especially valuable and should be among the kinds planted by every cultivator. The timber of the ash is adapted to a great variety of uses, particularly in the manufacture of farming-tools. On account of the great demand for this timber for agricultural implements, for carriages, and furniture, it is becoming scarce, and its cultivation promises to be very remunerative at an early day. The white ash becomes one of our largest forest-trees, attaining the height of 70 or 80 feet with sometimes a diameter of 3 feet at the base. The wood is white and remarkable for its toughness and elasticity. For these qualities it is used for hoops, pitchfork and rake handles, and for wagon-shafts. Emerson relates that an ash tree in Granville, Massachusetts, was rived into 3,000 rake-handles. It was 4½ feet in diameter and had a shaft of 70 feet without a limb. The white ash requires a deep, moist soil for its greatest perfection. Most prairie soils are well adapted to its growth. It bears transplanting well, and is remarkably exempt from the attacks of insects. The blue ash occurs in the bottom lands of the Western States. It may be readily distinguished by the young shoots being square or sharply four-sided. The wood is said to be more durable even than that of the white ash, especially when exposed to the weather, as for fence-posts, stakes, and rails. This species has a southern and the white ash a northern range, and probably the blue ash will be best adapted to cultivation south of 40° and the white ash north of that latitude. The seed of either may be sown in the fall, thinly covered with earth, and lightly mulched with straw, or it may be sown in the spring, after being mixed with moist sand and exposed for a few days to a warm sun.

The walnuts.—The black walnut is a timber of so much importance in cabinet-work, and is becoming so scarce by the constantly increasing demand, that no tree-cultivator should neglect to give it a place in his plantation. The tree begins to bear fruit at an early age, and the nuts, which much resemble those of the English walnut, are much esteemed by most persons.

The white walnut, or butternut, furnishes a wood of similar texture, light brown, fine-grained, and easily worked, but not so ornamental. The walnuts do not transplant well, and therefore the nuts should be planted where the trees are to remain. From the seed they grow vig-

orously, especially the white walnut, which almost equals the soft maple in thrift.

The elms.—Of our elms, the white and the red are the most important. For an ornamental tree for parks, lawns, and streets, they have a national reputation. They are hardy, grow with tolerable rapidity, and are readily transplanted at almost any age. The wood of the white elm is rather inferior in quality; that of the red is stronger and more durable, and is much used for the manufacture of wagon-hubs, carriage-wheels, &c.

The white willow.—Notwithstanding the prejudice which exists against this tree, on account of the extravagant representations made of it a few years ago as a hedge-plant, it attracts attention, from its rapid growth, as well adapted for wind breaks and screens. It may be planted in low grounds which are unsuited for most trees, and will thrive best in such situations. Its light and graceful foliage affords an excellent contrast with most other deciduous trees, and in places where fuel is scarce it is deserving of cultivation for an early and abundant production of wood.

Evergreens.—By evergreens is commonly understood the family of coniferous trees, because, in northern latitudes, these are the only trees which retain their foliage throughout the year. The deciduous trees give us shade and shelter during the summer, but in our prairie-regions, during the coldest half of the year, these trees are leafless and afford only partial protection from the fierce blasts of winter. This consideration alone should recommend the cultivation of evergreens to every dweller upon prairie-soil, for not only is the personal comfort of man and beast concerned, but also practical economy, as it is well understood by intelligent farmers that the abstraction of animal heat by cold winds must be counterbalanced by an increased supply of food. But the fact that these coniferous trees furnish our most valuable building-material, that our native supply of them is rapidly disappearing, and the market value advancing affords strong and urgent argument for the attention of tree-growers.

Pines.—The white, Austrian, and Scotch pines are considered the best for general cultivation. Mr. Bryant says of the white pine, "No one of our native forest trees is more generally useful and no one better merits careful preservation and extensive culture. As an ornamental tree, it is surpassed by few, if any, of the genus. Its foliage is soft, its hue agreeable, and the whole appearance of the tree graceful."

The Scotch pine is one of the most rapidly growing species, and succeeds in very variable soils, being perfectly hardy, even in the most northern parts of our country. It bears transplanting with more facility, perhaps, than any other species. Its thick, dense foliage adapts it well for screens or belts for the protection of orchards. On account of its rapid growth, its valuable wood, its hardiness, and its adaptability to different soils, it is strongly recommended for cultivation. The Austrian pine has much resemblance to the Scotch, having longer and rigid leaves of a darker color. It grows vigorously, and from its stiffness and strength resists the most violent winds and does not suffer under the heavy accumulations of sleet and ice, which sometimes greatly injure more slender species. It has been extensively planted for ornamentation, and although rigid and ungraceful in habit, its dense and dark foliage in winter renders it very pleasant to look upon.

Spruce or fir.—The white and black spruce, the Norway spruce, and the hemlock, or hemlock-spruce, are the most important species of this

genus, (*Abies.*) The Norway spruce in particular has been highly recommended by several western horticultural societies as the most suitable tree for belts for the protection of orchards. It is perfectly hardy, bears transplanting, is vigorous in growth, and adapted to all common soils.

The white and the black spruces are among the most valuable ornamental evergreens, and their presence in the vicinity of the farm-house or dwelling is at once an evidence of taste, and adds materially, not only to the market value of a place, but presents agreeable objects for the eye, and relieves the dreariness of the winter landscape.

Among ornamental evergreens perhaps none is more deserving of a place than the hemlock. Its delicate light-green and silvery foliage and slender, drooping, graceful branches form a pleasing contrast with the stiffer and more rigid pines and spruces. Perhaps on account of its commonness in the Northern and Eastern States, it has been neglected as an ornamental tree. Mr. Meehan says of it that "it would be no exaggeration to pronounce it the most beautiful evergreen in cultivation." It has been recommended as a screen, or ornamental hedge, but for this purpose there is probably no evergreen equal to the arbor vitæ. This bears close planting, may be pruned into any desired shape, and forms a dense, compact wall of the deepest green. The Siberian and Chinese arbor vitas are considerably cultivated, and may perhaps suit some localities better than the American.

The larch.—The larch, although not an evergreen, is a coniferous tree, possessing the same general characters of structure and fructification as those we have mentioned. The American and the European are the two species which are known in cultivation. The European larch has of late years been very highly, perhaps extravagantly, recommended for general cultivation as a timber-tree on the western prairies. It has, indeed, many valuable qualities, being a very rapid grower, possessing a pleasing symmetry of form, and furnishing a wood of great value and adapted to a great variety of uses. Extensive plantations of it have been formed in Scotland, which have proved highly successful. The plantations of the Duke of Athol, in that country, are everywhere famous, and have stimulated to extensive planting of this tree in other countries. It has been tried in this country sufficiently to prove its value as a rapid, vigorous grower, hardy and beautiful, but the wood grown here has not yet been sufficiently tested to fully decide on its merits. Recently, indeed, Professor Matthews, of the Iowa Agricultural College, has thrown out some doubts about the durability of the wood grown upon the western prairies. It seems highly probable that the quality of the timber is affected more or less by soil and climate. Louden says that, "A certain elevation of surface, coolness of climate, and inferiority of soil, are absolutely necessary to produce the timber in perfection." On broken hills, bluffs, and slopes, it can probably be grown with great profit. The American larch very closely resembles the European, having smaller cones and shorter and paler leaves. Its natural situation is in cold swamps in the northern portions of the United States, where it is known as tamarack or hackmatack, but it seems to succeed well in cultivation on high and dry soils. Many contradictory statements have been made as to the value of the timber, some considering it even superior to the European species, others accounting it of little value. Mr. Lapham, of Wisconsin, says: "Those who desire to make plantations of the larch should take into consideration the character of the land to be planted; if it be wet, then the American larch should be chosen. It is a tall, slender grower, with coarse-grained, du-

rable, and valuable wood, wherever light, straight timber, such as hoop-poles, is required."

The variety of our native forest-trees is very great, and undoubtedly there are many other kinds which are equally entitled to cultivation, with those we have named. Forest-culture is yet in its infancy here, and we should go on experimenting and observing until we learn what are the most profitable and useful kinds.

YELLOWS OF THE PEACH.

By Thomas Taylor, Microscopist.

On the 1st of July last I commenced a series of experiments by the moist process with the bark of a peach-tree affected with the yellows. Into five-glass receivers I placed, respectively, a few drops of water, just sufficient to form a moist atmosphere in each. Into No. 1 I put a piece of bark affected with the yellows; into No. 2 a piece of bark from a healthy peach-tree; into No. 3 a handful of peach-leaves from the unhealthy tree; into No. 4 a similar quantity from the healthy tree; and into No. 5 portions of bark from the healthy and unhealthy trees mentioned. All the specimens were secured from the outward atmosphere. The temperature of the room in which the specimens were kept was frequently at 90° Fahrenheit. These conditions were highly favorable to the development of such fungi-germs as mature under excess of heat and moisture. Previous to arranging the specimens in the receivers they were examined minutely with a low power, but no signs of fungi were visible. On the 15th day the unhealthy specimens in Nos. 1 and 5 exhibited on their external surface a spotted appearance. When viewed by a power of 75 diameters they were seen to consist mostly of a translucent, yellowish-brown, spiral, thread-like fungus known as *Næmaspora.*

Plate 15.

Plate 15, figures 1, 2, 3, and 4, represents the first stages of this fungus. When a portion about 0.3ths of an inch is placed under an object glass of one inch, and secured in the usual manner by means of a disk, with dilute gum-water, the spiral forms are seen to dissolve gradually, and ultimately to form a yellow stain. On viewing it with a power of one-eighth, it appears to be a mass of curved spores, resembling in form caraway seeds, but invisible to the naked eye. Each spore has a life-like motion

confined to a center of its own. When they are treated to the action of nitric, muratic, and nitro-muratic acids, no immediate change is observable; and in those strong acids the life-like motion continues, which, I think, proves that the motions are not the result of any form of organic life, but simply what is known as "Brownian motion," which is frequently seen when minute particles of inorganic matters are placed under a high power. When the spores are combined either with concentrated sulphuric acid or caustic potash they become completely destroyed, forming a homogeneous mass, and their organic structure is no longer visible.

Plate 16.

Plate 16 represents a sectional view of the bark. Figure 6, *Nœmaspora*; 7, the same, when placed in water or acid, except sulphuric; 8, a very highly magnified form of the spores contained in Fig. 6.

About the 20th day mycelium was found in abundance growing from the spiral threads, (see figure 5,) resembling double-celled *Puccinia*, the spores, varying in number from 1 to 10, and so small that a power of one-eighth was required to give good definition. Since contact with water dissolves *Nœmaspora* without destroying the life of the spores, it is evident that the action of rain or washes of pure water will only tend to diffuse the spores over the body of the tree and roots, while the application of solutions of sulphuric acid and alkalies will destroy them. Hence a remedy may be found for peach-yellows in the application of alkalies and sulphates, and their compounds, to the bark and roots of the trees. Statements have frequently been made that the application of hot lye has been known to cure peach-yellows when applied to the bark and roots. My observations seem to confirm these common rumors.

In receiver No. 5 the healthy bark was not contaminated, seemingly, with the *Nœmaspora*, notwithstanding its immediate contact during several weeks with the unhealthy bark. As might be expected, the common molds, *Penicillium*, and *Mucors*, grew all over the surface of the specimens, healthy and unhealthy. The leaves in Nos. 3 and 4 were next examined. They had been subjected to the same treatment as the bark. The healthy leaves, although confined during four weeks in a moist atmosphere, at a temperature ranging from 80° to 90°, exhibited no signs of mildew. A split branch to which the leaves were attached exhibited a small portion of *Mucor* fruit, and *Mycelium* on the sap-wood and pith; but the unhealthy leaves were completely covered in two weeks with *Mycelium*, (mold,) and the fruit of the common blue, yellow, and black *Penicillium* and *Mucors*. I have repeated these ex-

periments several times, always with the same results. It is evident that the healthy leaves possess an antiseptic substance, which prevents the growth of the common molds on them. A portion of healthy and unhealthy leaves from the trees above mentioned was analyzed in the laboratory to determine the respective amounts of moisture, organic matter, and ash in them, and gave the following results:

Healthy peach-leaves:	
Moisture	29.20
Organic matter	63.22
Ash	7.58
	100.00
Unhealthy leaves:	
Moisture	36.9
Organic matter	59.4
Ash	3.7
	100.0

The fact of the absence of ash or solid matter and of the increase of moisture in the unhealthy leaves, would of itself account for their greater tendency to mold. Since leaves do not absorb earthy matter from the atmosphere, it is evident that the cellular structure of the tree has in some way failed to perform its functions; for, had the ascending sap carried with it potash, lime, or other earthy matter, the leaves would have been stored with them, since the leaves have no power to evaporate them. The deficiency of earthy matters in the leaves may also account for the absence of ash in the fruit. If the theory is well founded that the leaves elaborate juice for the growth of the fruit, the leaves being deprived of proper nourishment, the fruit cannot mature. It has been long observed that trees affected with the yellows fruit earlier and mature prematurely, and soon decay. The presence of a larger amount of sap in the unhealthy than in the healthy, indicates an earlier and greater flow than in that of the healthy tree. The presence of watery sap in the leaves, twigs, and buds would induce naturally an early growth of fruit and premature decay. From these and other observations the disease seems traceable to the body of the tree or roots. Applications of washes in this case to the leaves would probably prove useless, but if applied to the bark and roots, might prove curative; and for that purpose, judging from microscopic observations, I would recommend the frequent application of hot lye as the best substance.

FACTS FROM VARIOUS SOURCES.

Economy in the use of Fodder.—At a national convention of German agriculturists, chemists, physiologists, and directors of the experimental stations, held in 1871, Professor T. von Gohren presented his views on practical rules for the use of fodder. The following are the leading points in his discussion: In fixing such rules it is necessary to know, first, the general principles on which the desired results in feeding stock depend; second, the most economical means of attaining those results. Other things being equal, every method may be recommended which makes fodder more palatable and diminishes the tax on the digestive organs. It is necessary to distinguish between

food designed to sustain the existing condition of the animal and that designed, in addition, to lay on flesh, produce milk, supply the demands of labor, increase, &c. With regard to the former kind, the farmer may assume, as shown by the experiments of Wende, that the amount of nourishment needed for 100 pounds of live weight is from ½ to 1 pound of nitrogenous food, and from 7 to 8 pounds of food free from nitrogen, or of the same composition as starch. In regard to the other kind, we may make subdivisions with reference, 1, to work; 2, to flesh or growth; 3, to fat; 4, to milk; 5, to wool; 6, to increase.

For producing flesh an increase of food in substances not containing nitrogen is needed. Albumen must be furnished, and this can be done to the best advantage when the effect of oxygen in the circulation is reduced to its minimum, a result secured by the use of hydro-carbons, such as oils and oily grains, which are far cheaper than albumenoids.

For producing fat the farmer should use non-nitrogenous foods, because they are the cheapest. Fats can be produced from other fats, from hydrocarbons, and from albuminates; of these three ways, practical agriculturists will chose the least expensive.

For producing milk, if quantity rather than quality is aimed at, the lacteal glands must be stimulated to their greatest activity, and for this purpose food rich in nitrogen is needed; and since storing up fat is inconsistent with the activity of the superficial glands, to which the udder belongs, foods which contain a large amount of hydro-carbon must be avoided.

Wool-production, provided the animal be kept in good condition, seems to be independent of the kind of food. In a specific sense there is fat-producing food; but in that sense there is no wool-producing food. It appears from the experiments of Wolff that sheep will grow lean in body before the production of wool will be arrested. Professor von Gohren concludes his discussion in the following words:

> The most important part of our labor relates to the increase of the race. Animals which are intended for labor must have a fully developed skeleton, ample room for the play of heart and lungs, and this can only be obtained by a full supply of food rich in albumen and iron. The development of the intestines should be restrained by concentrated food, that they may not interfere with the play of the lungs. Young cattle intended for fattening should be brought forward as fast as possible. According to Sauson and Claire Deville, early ripening depends, not so much on race, as on the composition of the bones; the sooner carbonate and phosphate of lime are deposited the sooner the animal will be ripe. To attain this end milk and grain must be fed.
>
> The development of the chest viscera will be retarded by want of exercise and pure air, since this renders the labor of the lungs less. The development of the fourth stomach is promoted by food that is easily digested and full of fat. The opposite rule should be observed with young cattle intended for milk. The animal should be kept rather thin, and hence should not be allowed to suckle too long. Skimmed milk, hay, tea, &c., is much better food for calves intended for the dairy, as well as much cheaper, than the milk of the dam.

CROPS IN HUNGARY.—The Department of State has transmitted to this Department a report on this year's grain crops in Austrian Hungary, forwarded by Mr. John Jay, United States envoy at the imperial court of Austria, the same having been courteously transmitted to him by the Baron Orczy, acting minister in that court for foreign affairs. From this report it appears that agricultural products are classified in three grades: good, middling, and bad; that the country is divided into districts and sub-districts, having reporters and sub-reporters, who, in each instance, report the grain as belonging to the one of these grades which its condition justifies. The aggregate of these reports is as follows:

	Good.	Middling.	Bad.
Fall wheat	243	448	112
Fall rye	110	338	330
Beans	109	218	96
Rapeseed	79	167	140
Spring wheat	183	229	62
Spring barley	363	255	43
Spring oats	391	287	55

It will be seen that, on the whole, wheat, barley, and oats are much above, rye considerably below, and the other products not far from middling.

SOUTHWESTERN TEXAS.—Our correspondent resident at Kerr County, Texas, sends a communication respecting the climate, agricultural resources, and future prospects of that county and adjacent regions, from which the following statements are condensed. Though in the latitude of Southern Louisiana the altitude and rapid drainage of the region along the Upper Rio Guadalupe place it out of the reach of malarial influences, and the consequent special danger of losing time by sickness in the most pressing labor-season—that of harvest. Of the healthfulness of the climate and the rare beauty of the scenery, language cannot convey an adequate idea; in order to be appreciated, the elevated, pure, vitalizing atmosphere must be breathed, and the charming scenery, variegated by mountain, hill, slope, and vale, and by open meadows, alternating with groves of oaks of different varieties, and of other forest trees peculiar to Western Texas, must be seen. The Guadalupe, worthy its traditional reputation of being the most lovely river in Texas, and its beautiful tributaries of clear, pure water, afford unlimited water power and abound in fish of the finest quality.

For the production of cotton, corn, and the smaller grains, no part of the State is more favorable. Experiments in cultivating cotton have proved the locality to be unsurpassed in adaptation—a full bale to the acre being, not the rare exception, but the average yield. The yield of wheat, under the culture of intelligent and *progressive* farmers, is from thirty three to forty bushels per acre; and corn, this season, promises an abundant crop. Cereals mature from four to six weeks earlier than in the wheat-growing districts in the northern part of the State. The region is also unsurpassed in its adaptation for raising stock. The range of natural pasturage is extensive and of the best quality; it is watered with a plentiful supply of pure, flowing water; and the elevated surface, made up of hill and dale, is free alike from the oppressive heat of summer and the uninterrupted sweeping blasts of winter, to which the lower and more level tracts are subject.

At fruit-culture there have hitherto been only a few attempts; but the region is emphatically the native home of grapes. The evidence of this is seen in the fact that they grow wild in the greatest luxuriance, and in varieties which seem endless, "the mountain and hillsides being in many places covered, from base to summit, with dense masses of luxuriant vines, heavy with luscious burden, and all susceptible of improvement by judicious cultivation. It is wonderful to witness such exuberant growth of vine rooted amid rocks apparently untouched by earth or moisture." Apples, pears, peaches, plums, and cherries, recently introduced, all afford most favorable indications of thrifty growth and abundant yield.

To these favorable conditions of climate and soil are to be added the fact that timber and rocks for buildings and fences are abundant, and that a law of the State gives to each actual settler 160 acres of unappropriated land, on the condition that he occupy it three consecutive

years, without being absent within that period more than six months; and that within the counties of Kerr, Kendall, Kimball, Blanco, Menard, and Edwards there is now public domain on which thousands of 160-acre farms may be advantageously located.

The drawbacks which have hitherto operated to prevent this region from being rapidly settled are now fast passing away. Among these were remoteness from any great thoroughfare, the ever-present fear of depredations to which a frontier settlement was exposed from marauding Indians, the extraordinary occurrence of three "grasshopper-years" in succession—a pest now passed away, and not likely to return for the same length of time, at least within the present generation—and, to crown all, the decade of afflictions, crippled enterprise, and impoverished resources brought on by the late war; consequences from which the country is now happily recovering.

To disabuse the public mind of the erroneous impression as to the prevalence of drought in Western Texas, the following statistics of the amount of rain-fall at Kerrville, Kerr County, for each of the last four four years is given: In 1868, 46.60 inches; 1869, 49.03 inches; 1870, 35.12 inches; 1871, 24.85 inches.

Cultivation by steam in Europe.—At an agricultural meeting recently held in Scotland, some interesting statements were made respecting the origin, progress, and results of cultivation by steam in Europe. In 1855, a Mr. John Fowler, of Essex County, England, started his first steam-plow. He subsequently expended about $350,000 in experiments in cultivating by steam, and at the end of this great expenditure had to show for it only a lot of old machinery. But as early as 1858 the question whether, under certain conditions, such as a surface sufficiently level, free from obstructions, &c., plowing could be done more profitably by steam than by horse-power was satisfactorily settled. Now, in Great Britain, there are single establishments for manufacturing steam-plows so extensive that they furnish constant employment for not less than 1,200 men. In England, between 400 and 500 sets of steam-plows, held, some by companies and others by individual owners, are worked for hire, and are found to be a profitable investment. A tract of 500 acres, near London, so unproductive that it could not be rented for $3 per acre, was bought by an enterprising farmer who removed the fences, under-drained, and, with a steam-plow, put the whole into grain crops. Last year, after allowing 10 per cent. on the money invested in the land, his clear profits were $18,000. The soil he thus improved by deep steam-plowing is a stiff clay, that could not be profitably worked by horse-power. Another tract of 5,000 acres, that had been regarded as worthless, was bought by a farmer who plowed it with steam-power to the depth of 3 feet, and was rewarded by crops of astonishing thrift. In Scotland, cultivation by steam is becoming general, and producing results equally marvellous. Joint stock companies are investing in land and steam-machinery and securing large dividends, while individual farmers have invested from $6,000 to $10,000 in steam-machinery with very profitable results. In Germany, also, steam-power is working a revolution in agriculture.

In connection with the subject, it was stated that the Pasha of Egypt now employs on his extensive domain 400 steam-plows; and furthermore, in prosecuting this feasible mode of cultivating on a grand scale, is building, "on his farm," 400 miles of railway, and, for transporting and manufacturing the raw material produced, has ordered thirty locomotive-engines and $3,000,000 worth of sugar-machinery.

Loss of fertilizing properties in hen-dung.—In Italy the manure of fowls and pigeons is an article of commerce. Professor Sestini has been examining the comparative values of fresh dung and of that which is sold, and finds the principal difference to be that fresh dung contains 64 per cent. of water, while the commercial article has only 25, or less. By long exposure to dry air, five-sixths of the ammonia was dissipated. To prevent this loss, experiments were made with plaster, green vitriol, and clay, finely pulverized, and exposed to ammonia vapor for twenty-four hours. The vitriol absorbed 5.5 grams, the plaster 5 grams, the clay 4.9 grams. These substances were next mixed with fowl-dung, and exposed for a month in chambers where the escaping gases could be collected, with similar results. A strong odor of ammonia could be perceived arising from the clay mixture, but very little from the other two. Fungi developed rapidly on the mixtures of clay and plaster, but not on that containing vitriol. It is well known that these parasites depreciate the value of nitrogenous manures. The practical deductions were, that the dung should be collected weekly and placed in covered vessels, each layer being sprinkled with about 5 per cent. of green vitriol. As to its commercial value, it is much poorer than guano in nitrogen and phosphates.

Demand for agricultural implements in New South Wales.—Mr. Jules Joubert, secretary of the Agricultural Society of New South Wales, in an official communication addressed to this Department, represents that in that colony there is an urgent demand for improved agricultural implements and labor-saving machinery; but as yet it has neither the facilities nor the requisite skill for manufacturing them. Hitherto imports from this country have been limited to lumber, furniture, and a few land-mills; but he expresses the opinion that a well assorted exhibition of American implements, inventions, and labor saving machinery would not only be a great attraction in the colony, but result in opening an extensive and profitable market for most of the articles exhibited. He is instructed by the society to state that, should any responsible individual or company in the United States desire to make trial of the plan suggested as a business enterprise, they have a spacious building adapted to the purpose, located in the Prince Albert park, Sydney, which would be placed at the disposal of the same, together with every other facility at their command.

Irrigation in Colorado.—A correspondent from El Paso County, Colorado Territory, reports that irrigation of the natural grasses is coming into practice, and enough has already been done to demonstrate that in the course of three or four years upland can thus be made to produce from two to three tons of hay per acre; the natural grass giving place to the blue grass, which makes excellent hay.

Epizootic aphthæ.—This disease is reported as spreading in Marion County, Arkansas; but it is in a mild form, and very few cases prove fatal.

Relations of local diseases to the nature of the soil.—Dr. Moffat has read before the British Association a paper on the above subject, in which he shows that the nature of the soil exercises considerable influence on the character of endemic disease. His district lies on the carboniferous and red, or Cheshire, sandstone formation. Anæmia is the prevailing condition of the inhabitants of the carboniferous land, who are both miners and farmers, while it is almost unknown on the red

sandstone. Consumption is also more prevalent in the first-named district. Since anæmia is a want of iron in the blood, Dr. Moffat examined the constitution of wheat grown on the Cheshire sandstone, and found it produced much more ash, and hence a larger proportion of mineral constituents, including oxide of iron, than that grown on the corboniferous soil. He estimates that a pound of wheat from the first furnishes five grains more of oxide of iron to the consumer than a pound of wheat from the second soil, which accounts for the comparative poverty of the blood of the miners in iron and phosphoric acid. An examination of the blood of the animals kept in the two districts confirmed the above observations.

REMEDY FOR SPANISH FEVER.—A Kansas farmer professes to have treated with invariable success cattle affected with Spanish fever, according to the following recipe:

When the animal loses its appetite and becomes stupid, take several gallons of tepid water, for a full-grown steer, and inject it from a large syringe; and in about twelve hours give from a half pint to a pint of linseed-oil, to move the bowels, and the ox will get well.

He claims that the above recipe produces a reaction, softens the parts, and restores the normal action of the system.

CHANGE IN THE COURSE OF RAIN.—A correspondent writing from Hawkins County, Tennessee, states that ordinarily, in that locality, the rains all come from the southwest, conforming to the direction of the rivers and mountains; but what little rain has fallen during the dry season, both last year and this, has all come from clouds passing from north to south, directly across the rivers and mountains. Scientists are asked to account for this change of direction. The droughts, during which the change occurs, are not owing to the absence of forests, for the country is heavily timbered.

TOBACCO IN SANTA CLARA COUNTY, CALIFORNIA.—Mr. J. D. Culp, of Gilroy, Santa Clara County, California, who has had much experience in tobacco-culture, claims to have a method of raising and curing it by which it is made equal to the best imported Havana, and this claim is indorsed by certificates from leading tobacco houses in San Francisco. He has secured the aid of capitalists, and is preparing for extensive operations. His crop of 1871, on five acres, planted with Havana seed, amounted to 8,000 pounds. In illustration of the fertility of his soil, he states that he has raised on the same land, without manure, twelve successive crops of tobacco, the last being fully equal to the first, and the land exhibiting no deterioration. He has been at no expense for protection against tobacco-worms, wasps having destroyed them on appearance.

INDUSTRIAL EDUCATION.—The board of regents of Kansas Agricultural College are reported as having adopted a new curriculum, comprising agriculture, horticulture, stock-breeding, veterinary science, farm economy, mechanics, and architecture.

MERINO RAMS FOR COLORADO.—It is reported that 800 Spanish merino bucks, selected from among the purest blooded flocks in Rutland and Addison Counties, Vermont, have recently been purchased for shipment to Southern Colorado. Three hundred are for Thomas O. Boggs, of Bent County, designed to supplant the long-wooled bucks from Canada, which he has tested for the last two years. Having tried Cotswold, Leicester, Southdown, and the Vermont merino, he decides unhesitatingly that the latter are the best for crossing with Mexican

sheep. Another 300 are for Messrs. Ripley & Thomas, of the same county, and the remainder for the general market. They are to leave Vermont about the 1st of October.

EFFECT OF CLIMATE AND SOIL ON THE EUROPEAN LARCH.—Professor J. Mathews, of Iowa Agricultural College, is reported as having experimented with this tree, in Iowa, for the last seventeen years, with results quite satisfactory, respecting the rapidity of its growth, but unfavorable respecting its durability. He has one tree 45 feet in height and 15 inches in diameter one foot above the ground. Many others are from 15 to 30 feet in height. In 1869, he cut several trees and manufactured them into grape-stakes, setting them about the 1st of May. In April last, he found them all so decayed that they either had fallen or would break with a slight pressure. Assuming that its durability depends upon its peculiarity of texture, together with the amount of resinous substance it contains, he cites authorities to show that it undergoes great changes in these and other respects as the result of differences in climate, location, and soil. In the most northern regions in which it is found, it is only a trailing shrub, while upon the Alpine hills, and in other congenial localities, it grows to the height of 100 feet and more. He quotes from a circular, published in 1869, by E. Y. Teas, as follows:

> In Savoy, according to a French writer, houses are built of larch-logs, squared and placed one upon another, in the style of our American log-houses. The heat of the sun melts the resin contained in the logs, and the structure, thus rendered impervious to air and moisture, will last for centuries. In some parts of France houses are now standing that have been built two hundred and fifty years, and still show no signs of decay; the great amount of resinous matter rendering the wood imperishable; and on this account it will outlast red cedar. There seem to be well authenticated instances in Europe in which larch-timber, having been in use for a thousand years, still remains sound.

He further quotes from Loudon's Encyclopedia statements that resinous timber indigenous to cold regions loses the qualities on which its durability depends when transferred to a warm climate and fertile soil, and that a certain degree of coldness of climate and inferiority of soil is essential for producing larch-timber in perfection. Whether upon our rich prairie soils it will lose durable properties is a practical question upon which further light is needed.

HOPS IN ENGLAND.—According to the estimates of the Mark Lane Express 65,600 acres are devoted to the culture of hops in England, and the area is gradually increasing. Kent, the largest hop-growing county, had 32,000 acres in this crop last season, the early grounds averaging 1,400 to 1,600 pounds per acre; Sussex, next in importance, 14,500 acres, averaging 1,800 to 2,200 pounds per acre. Surrey is noted for a choice quality of hops of bright color and superior aroma.

GRASS CULTIVATION AT THE SOUTH.—Many southern farmers are diligently adapting themselves to the new order of things by modifying their system of culture. Cotton, in some districts, is even now regarded as of secondary consideration, and the cultivation of a diversity of crops has been entered upon with commendable zeal. An enterprising farmer in Mississippi has instituted experiments in raising fruit and in seeding down a portion of his land to grass, both of which appear to have been quite successful. His orchard, embracing winter-apples, has already become a source of profit, and his success with grasses has been such as to constitute him a strong competitor with the hay-makers of the North. He has been especially successful in clover, obtaining a luxuriant growth of three tons to the acre. Having failed in seeding with small grain, he adopted the method of securing a stand of clover by

first planting peas, and then following up the crop with a dressing of manure. And this is not an isolated case. Other similar experiments in Mississippi are said to have removed the doubts of skeptics, and to have confirmed the most ardent believers in the success of cultivated grasses at the South. A writer in the Rural Alabamian relates an instance of remarkable success in the growing of clover, at Tibby, in Lowndes County, Mississippi, to which it might be difficult to find a parallel at the North. Upon a field seeded fifteen years ago to clover, and which has repeatedly produced both grain and hoed crops since, the clover crop last year was a most luxuriant one, although the field has never been seeded to clover but the one time.

In a very comprehensive and practical article on the cultivation of the grasses and forage plants of the South, Mr. C. W. Howard, in the Southern Farm and Home, Memphis, Tennessee, says, concerning lucerne:

As a forage-plant at the South, lucerne is very far superior to all others. It is used for three purposes. First, for feeding green, or soiling; used in this way, it is best to cut the lucerne a day in advance, so as to feed it in a wilted state. *It must never be pastured.* * * * * * Lucerne hay is extremely nutritious, and is relished by horses, cattle, and sheep. It is preferred by the domestic animals to any other kind of hay. The product of lucerne is enormous. Five tons of excellent hay may be cut from an acre. It is estimated that fodder, green and dry, may be obtained from an acre of lucerne for the support of five horses during the entire year. This included the great bulk of green food during the spring, summer, and autumn."

The seed of lucerne has been very widely distributed by the Department; and the most favorable accounts of success in its culture have been returned.

THE STOCK TRADE OF BUFFALO.—Mr. Ch. Bevichy, a stock-dealer of Buffalo, New York, writing under date of July, says:

The stock-trade of this city has been of rapid growth and is increasing. In 1857 the total number of animals was 533,220. Since that date the trade has steadily grown and promises to continue to increase. From this point these animals go by railroad to Philadelphia, New York, and Boston, and the intermediate lage towns, there awaiting the turn of those markets. When the Northwest and Manitoba come to send out cattle and horses it is thought they must come here for distribution. Those regions, it is said, will rival Texas in cattle-raising, notwithstanding the severity of the climate. The cattle, &c., from Northern Minnesota, Dakota, and Manitoba must pass east by rail along the southern shore of Lake Superior to the Sault Ste. Marie, and then through Canada to this city. The whole distance from the Red River (an average point about one thousand miles) to Buffalo will be less than from Kansas, from which State many of our cattle come; and it is plain that sheep, horse, and cattle raising will have to be the main reliance of the people of the Northwest, whose broad, grassy plains never fail to produce food for winter and summer supplies.

CATTLE-PLAGUE.—The cattle-plague, or rinderpest, or steppe-disease, as it is variously called, has reappeared in England, where, when it first appeared, several years ago, the place of its origin was investigated without any positive result. It was commonly believed, however, to have been imported from Russia. In reference to its source at the present time, the evidence is less doubtful. Three cargoes of infected animals recently arrived in England directly from Russia. Prompt and effective measures were taken to prevent the spread of the decease, and an order of government was at once issued forbidding the landing thereafter at any port in Great Britain of cattle from any place within the Russian dominions. The deceased animals were killed, and a careful *post mortem* examination left no doubt of their having been infected with the cattle-plague. It was shown that symptoms of the disease had manifested themselves at the time the animals were embarked; that several animals had died at sea; that fresh outbreaks of the disease

were occurring in the Baltic provinces of Russia, where severe losses had been sustained in many districts; and that no precautions had been taken, apparently, to prevent the spread of the disease. One hundred cattle are said to have perished in Novgorod alone. The plague is also reported to exist in Galicia, in Lower Austria, in Scutari, and in Circassia, whence it would naturally spread to the Crimea.

AGRICULTURAL AND MINERAL RESOURCES OF WESTERN TEXAS.—A committee of the Western Texas Agricultural, Stock-Raising, and Industrial Association, writing to the Department, say:

> We feel assured that in the production of wool, cotton, corn, wheat, oats, rye, barley, ramie, beef, hides, tallow, wax, mesquite gum, pecan-nuts, &c., Western Texas can successfully compete with any equal portion of the earth's surface; also in valuable minerals such as iron, coal, lead, silver, gold, copper, bismuth, gypsum, mica, kaolin, steatite, molybdenite, asbestos, malachite, pipe-clay, marble, calcite, &c. We have also among our citizens those who have given proof of mechanical and industrial genius.

FOOT AND MOUTH DISEASE IN ENGLAND.—Foot and mouth disease is prevailing to an alarming extent in England, especially in Norfolk, Cumberland, Dorsetshire, Huntingdon, Westmoreland, and Yorkshire. English official reports recently issued show 691,565 animals attacked by the disease in 1871, and at the present time it is even more widely spread and of unusual virulence. Frequently animals are attacked the second or third time, and in many districts there is a considerable percentage of deaths. About the 1st of August, returns for the week showed from Northamptonshire 9,454 cattle and sheep affected; from Buckinghamshire, where the disease was rapidly spreading, 13,743, distributed among 396 farms; from Norfolk, 13,000; from Dorsetshire, 11,050. In the early part of July the council of the Royal Agricultural Society authorized the expenditure of a sum not exceeding £100 for investigations into the causes of periodic outbreaks of this disease in England, particularly among importations from Ireland.

COTTON IN CALIFORNIA.—A movement for introducing the culture and manufacture of cotton into California, upon an extensive scale, is now in apparently successful progress. A "Cotton Growing and Manufacturing Association" has been incorporated for the purpose, under the auspices of which a selection has been made of the valley of the Kern River as specially adapted to the object, possessing a favorable soil and climate, and ample water-power for manufacturing purposes. Ten thousand acres of land, including a town-site with considerable improvements, have been purchased, and successful experiments in raising cotton have already been made. The town is located at the foot of the Sierra Nevada Mountains, and the lands are available for immediate planting; and the property is said to embrace peculiar facilities for promoting the growth of this special producing and manufacturing industry.

THE CRANBERRY-CROP IN NEW JERSEY AND MASSACHUSETTS.—The cranberry crop of New Jersey is reported much below an average, and that of Cape Cod, Massachusetts, almost a total failure, a large proportion of the vines having been killed last winter, and the remainder greatly ravaged by worms.

POTATO-ROT IN ENGLAND.—Potato-rot is prevailing to an alarming extent in England, and fears are entertained that much the greater part of the crop will be destroyed. But it is stated that districts where the atmosphere is impregnated with vapors from smelting-works are comparatively free from the disease.

ENGLISH SPARROWS IN AUSTRALIA.—It appears from complaints received by the Royal Horticultural Society that fruit-crops in Australia have been seriously injured by the English sparrows imported into that country.

EXPERIMENTAL STATIONS.—The system of agricultural experimental stations is rapidly extending in Italy. In consequence of information obtained and circulated by the minister of agriculture, respecting the experimental stations in Germany, seven new stations have been established on the German model. These are located at Undine, Modena, Milan, Lodi, Padua, Florence, and Turin.

AGRICULTURAL SPECIALTIES IN NORTH CAROLINA.—Mr. J. L. Labiaux, a native of France, now residing at Ridgway, North Carolina, writes us that he is making efforts for the introduction into his section of experts in various agricultural specialties. He commenced by arranging for the settlement of two of his countrymen, skilled gardeners, lately employed near Philadelphia. Their capital being too small to purchase and stock land, Mr. Labiaux negotiated for them a partnership with a citizen of Raleigh, for five years, on terms mainly as follows: The latter furnished 66 acres of land near Raleigh, valued at $40 per acre, and $1,000 for horses, implements, seeds, manures, &c. The interest on this capital is to be an equivalent for the labor of his copartners who are privileged to borrow from the company's funds $15 per month, each, for the first six months, as a provision for their sustenance meanwhile. At the expiration of the partnership, the entire capital advanced is to be repaid by the company, when the surplus accumulated will be equally divided. The arrangement was perfected last November, and, at this time, is working to the satisfaction of all parties concerned. Since the inauguration of this enterprise, Mr. Labiaux has formed other associations of like character, one of which is a partnership between himself and Mr. V. Clerc, from Vaucluse, France, chiefly for the purpose of viniculture; but the latter being an expert in the culture of madder, it is intended to devote four or five acres to that specialty.

Mr. Labiaux further informs us that a steam fruit-drying establishment has been recently erected at Ridgway. It uses the "Baltimore process" of pneumatic evaporation, claimed to be covered by the patents of Marshall P. Smith, of Baltimore, Maryland, and identical with that commonly known as the Alden process.

THE NEW YORK MEAT-MARKET.—The following are the chief points of a recent article in the New York Times, giving some statistics of the New York meat-market: The markets of the city require weekly 8,000 to 9,000 cattle, 3,000 calves, and about 26,000 sheep. The first-class beeves of the New York market are mainly Durham grades, (as in London,) and there is no considerable proportion of these where the grade is higher than half-blood. Illinois, Missouri, and Kansas are the most important sources of supply, both in quantity and quality. The evils attendant on cattle transportation are still severely felt. Cattle continue to be transported in crowded and badly constructed cars, in which they cannot be either fed or watered without much loss of time. As a consequence they become restive, and before reaching the journey's end many of them are so badly bruised that when they are slaughtered large portions of their meat are unfit for use. The improved trucks which were temporarily used on one or two lines of road have been set aside, because they could not be quite as quickly loaded and unloaded, nor packed with as large a number as in the case of the common trucks.

The quality of the mutton and lamb brought to the New York market is, as is well known, greatly inferior to that of like meats in the London market. The price of wool greatly affects the number of sheep marketed. In 1870 the weekly supply was nearly 50,000; in 1871 the number was little more than half as large. Lancasters and Cotswolds, from Canada, lead in quality, and these are received from September to January. A few of a similar quality are received from Kentucky in the winter. Ohio sends the largest number of sheep—merinos to a considerable extent, and of good quality. The sheep received from Michigan have more merino blood and rate lower in weight and quality. The Illinois and Iowa sheep are rather coarse, and those from Indiana are among the poorest received. Spring-lambs come chiefly from New Jersey, Maryland, and Delaware, the earliest arrivals having the advantage, even if not of best quality. Summer and autumn lambs come chiefly from the States of New York and Kentucky, very few being received from the other States.

JUTE.—A correspondent at Augusta, Georgia, under date of August 31, 1872, represents that the jute-plant has done well in that locality, and that he hopes to raise enough seed to test its adaptation to that climate. Another at New Orleans, Louisiana, states that the jute-plant succeeds well, and that the ramie-cleaning machine is well adapted to the preparation of jute. The Southern Ramie Planting Association, in the same city, has also had encouraging success from jute-seed received from this Department. A specimen of the fiber, transmitted by E. Lefranc, president of the association, is about 4 feet long and of considerable tenacity. This was prepared by a ramie-cleaning machine.

FIGS.—A correspondent at Westport, Jackson County, Missouri, reports that eight of the fig-cuttings, received from the Department in November last, have made a growth of over 4 feet. He therefore expresses the hope that with proper care figs can be grown in Missouri.

CLOVER IN SOUTH CAROLINA.—A correspondent writing from Pomaria, Newberry County, South Carolina, represents that exclusive cotton culture is giving place to more diversified production. In evidence that this section is adapted to the growing of grasses, he states that in May last, from 2½ acres of stiff, red upland, he cut 10,000 pounds of fine red clover hay. His success has occasioned an extensive demand in the region for red-clover seed.

FULTZ WHEAT IN PENNSYLVANIA.—Mr. William Huber, of Chambersburgh, Pennsylvania, reports that last fall, on a field of 6 acres, limestone soil, with gravel, which had been in corn and potatoes the preceding season, he drilled in 1½ bushel of Fultz wheat per acre, applying no manure. A dressing of barn-yard manure had been applied for the potatoes, but no fertilizer had been used since then. From this field he has obtained 231.3 bushels of wheat, by weight, or a litttle more than 38½ bushels per acre, besides a yield of good straw amounting to about 1½ tons per acre. The yield was especially remarkable in view of the greatly reduced yield of the general crop.

TIMBER-PLANTING IN NEBRASKA.—In Hall County, Nebraska, timber-planting has become quite popular. It is predicted by our correspondent that within twenty years the "Great American Desert" will be far better timbered than the Eastern States.

HOPS AND CRANBERRIES.—These are reported as two of the most important farm-products in Juneau County, Wisconsin. This season the

hop crop will be light, but promises to be of superior quality, with no sign of vermin or blight. Of cranberries, which are extensively cultivated, there is every indication of an abundant crop. In Monroe County, also, several thousand acres of wild cranberries are reported as promising above the average of former years.

SPARE THE BIRDS.—Our correspondent in Perry County, Illinois, after mentioning the extensive ravages of the chinch-bugs, sweeping the most promising crops, states that, in Southern Illinois, during the last winter, quails were slaughtered by the thousand dozen for market. As they have been almost annihilated in that region, insects abound. He thinks this criminal folly should be repressed by vigorously executed legal enactments.

MARKET GARDENING IN KENTUCKY.—The western portion of Jefferson County, Kentucky, is largely devoted to gardening under the energetic and intelligent management of the Germans, who have very successfully developed this branch of industry. The proximity of the city of Louisville affords a large supply of organic fertilizers, enabling the cultivators to secure two crops per annum from the same ground.

MILK FEVER.—Our correspondent in Pulaski County, Illinois, describes a case of milk fever in one of his cows, the symptoms of which were swelling and heat in one side of the udder, the second day after calving. The calf was admitted to her, but the swelling increased, as also did the febrile symptoms, resulting in great prostration and trembling, with partial loss of motion in the limbs. Though there was no stricture of the bowels or lack of appetite, mild antimonial doses were administered, with epsom salts and aromatic herbs, producing an active cathartic effect. Cold water was applied to the inflamed parts, and afterward a mild mercurial ointment, mingled with pulverized camphor and tincture of iodine. The cow has recovered, with a partial loss of milking capacity in one teat. Our correspondent recommends the reduction of food, and even occasional neck bleeding, as the calving-time approaches.

FRUIT CULTURE IN KENTUCKY.—Trimble County, Kentucky, is becoming the theater of extensive fruit culture. Two parties from Cincinnati have lately set out an orchard of 400 acres, and other enterprises on a similar scale have been projected. One apple-orchard of 125 acres has just commenced bearing. The prospect is that within a few years half the high lands of the county will be under fruit cultivation.

CLOVER IN THE SOUTH.—Our regular correspondence shows the rapid increase of this crop in several portions of the South. While one variety suits one section, another is found profitable elsewhere. Clover, as a field crop, has been found a great success in large areas. It is found, also, in some locations, to be one of the best paying crops.

BAD FINANCIERING.—A Georgia correspondent states that the farmers in his region have in many cases mortgaged their crops for provisions for the coming year and for fertilizers. A short crop of cotton will ruin large numbers of them. A correspondent in another county of this State says that the cotton mania has broken out with fresh virulence among the planters. Not less than 200 tons of guano have already been purchased, mostly on credit, for the quickening of the cotton-crop. Here, also, planters are mortgaging their crops for provisions.

SETTLEMENT OF WASHINGTON TERRITORY.—The settlement of Western Washington is proceeding at a rapid rate. A hundred new farms were lately opened in one week, and a greatly increased acreage of land has been placed under cultivation in the Chehalis Valley alone.

MALFORMATION OF CALVES.—A regular correspondent in Monterey County, California, notices "a remarkable disease this spring among calves on some dairy and stock ranches." The cows producing them are a cross between the native and the Durham breeds. The calves are born deformed, rickety, with large heads and joints; legs weak and spreading at an angle from 10° to 30°; many cannot walk at all. By being held up to suck they often gain strength and are able to walk. Many are still-born. The cases are limited to a few ranches and are supposed to represent the progeny of diseased bulls. Some ranchmen and dairymen think they are the result of pregnant cows feeding upon acorns in autumn. Sheep, goats, deer, and other animals eat freely of the acorns without injury. The water of these ranches is excellent.

PROPORTION OF SEED AND CULTURE FOR A CROP OF POTATOES.—A correspondent at Albany, New York, is of the opinion that, in raising potatoes, farmers generally err in two respects: they use too much seed and give the land too little tillage. In illustration of his view he gives the results of an experiment. His tenant, in selecting Early Rose potatoes for planting, had thrown out all not larger than an English walnut. He gathered 22 quarts of the rejected ones, cut them in two or more pieces according to size; planted, without manure, in ground of ordinary tilth; cultivated and hoed them thoroughly three times, and dug 68 bushels, by measure, of unusually large potatoes.

FESCUE GRASS IN TEXAS.—A correspondent in Montgomery County reports that the fescue grass proves to be of great value. In illustration he states that on less than two acres four mules and two milch cows, besides hogs, were pastured all winter, and adds that there is a perceptible difference in the flavor of milk and butter after pasturage on this grass.

METEOROLOGY IN COLORADO.—A report of meteorological observations, for the month of August, kept at Colorado Spring, seventy-five miles south of Denver City, (the present terminus of the narrow-gauge railroad between Denver and Rio Grande,) the latitude of which is about 39°, and the elevation 6,000 feet, contains the following interesting facts: The lowest mean temperature on any day was (29th) 50°.5; the highest, (20th,) 74°.5; the average for the month, 68°.3; the amount of rain, 4.02 inches, of which 2.92 inches fell during the last six days, on each of which rain fell. At this location, under date of September 9, vegetation of all kinds is reported as growing luxuriantly, corn as a heavy crop, and wheat harvested in good condition, considering the frequent rains.

FARMING IN IOWA.—James P. Coulter, of Johnson County, raised last year 12,000 bushels of corn, 2,000 of oats, 500 of wheat, 900 of timothy-seed, and 600 of flax-seed; keeps 300 hogs, 40 cattle, 18 horses, and has 640 acres of prairie-land under cultivation.

EXTRAORDINARY YIELD.—It is reported that of Fultz wheat sent by this Department to Botetourt County, Virginia, Mr. Grayhill sowed 3½ pounds on the 16th of October, and harvested the crop on the 29th of July last. It yielded 5½ bushels by measure, the whole weighing 333 pounds.

TWO CROPS IN ONE SEASON IN ALABAMA.—A correspondent in Franklin County gives the following facts: April 22, he sowed one acre in Hungarian grass; by June 19 it was fit to cut; he took off the crop, and planted corn June 30, and it made 30 bushels. March 15, he sowed four acres of Norway oats; cut a very heavy crop July 1; planted the land to corn on the 12th and 13th, and made fully 30 bushels. The land on which this experiment was made had been under cultivation thirty-five years, and the season was unusually dry.

A HOG DISEASE AND ITS REMEDY.—A correspondent in Shelby County, Kentucky, describes a disease (which he calls cholera) prevailing in that section among hogs, and gives a remedy. Its symptoms are a hacking cough and "hard and marble-like excrement." Soon as these are noticed administer calomel, in the proportion of half a pound to every fifty shoats, mixed with corn so moistened that it will adhere. This is designed to change the action of the bowels, and if that effect does not follow in due time the dose must be repeated. Next, mix in troughs salt, wood-ashes, and coal-tar, in the proportion of 7 parts of salt, 7 of ashes, and 2 of tar. The hogs will soon become fond of it, and the effect will be to remove from them all vermin, and keep them generally in a healthy condition. This, he testifies, has been found by all who have tried it efficacious both as preventive and remedy.

CHICAGO STOCK MOVEMENTS.

A statement of the receipts and shipments of the Union Stock Yards of Chicago has been received from Mr. George T. Williams, assistant secretary, which is presented in detail, as follows:

RECEIPTS.

CATTLE.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	7,374	7,136	9,990	11,385	14,164	9,141	59,190
Illinois Central Railroad	8,849	7,654	8,745	6,369	6,610	6,726	44,953
Chicago, Burlington and Quincy Railroad	12,280	10,460	15,510	23,143	29,796	26,019	117,208
Chicago and Northwestern Railway	8,572	9,320	11,093	8,700	10,366	8,125	56,176
Chicago and Alton Railroad	6,565	5,500	6,953	8,381	8,992	11,696	48,087
Pittsburgh, Fort Wayne and Chicago Railroad	145	113	90	79	3	4	434
Michigan Central Railroad	34	30	5	31	31	8	139
Michigan Southern Railroad	241	69	242	63	114	335	1,034
Pittsburgh, Cincinnati and Saint Louis Railroad	104	74	126	49	131	308	792
Chicago, Danville and Vincennes Railroad	793	541	263	158	233	755	2,743
Driven into yards	33	190	183	35	1,260	326	2,027
Total	44,990	41,087	53,170	58,393	71,700	63,443	332,783

HOGS.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	59,685	44,351	31,057	32,307	47,085	56,720	271,205
Illinois Central Railroad	63,182	39,449	28,354	29,341	49,783	45,554	255,663
Chicago, Burlington and Quincy Railroad	131,171	99,904	51,269	53,721	83,526	76,540	496,131
Chicago and Northwestern Railway	65,678	56,636	36,637	24,644	42,193	40,513	266,301
Chicago and Alton Railroad	29,993	22,768	20,352	25,113	34,866	29,198	162,290
Pittsburgh, Fort Wayne and Chicago Railroad	2,001	384	51	332	161	159	3,088
Michigan Central Railroad	3,000	800	198	503	359	55	4,915
Michigan Southern Railroad	2,677	1,085	1,087	1,013	1,436	957	8,255
Pittsburgh, Cincinnati and Saint Louis Railroad	1,266	589	271	325	1,205	701	4,357
Chicago, Danville and Vincennes Railroad	3,259	2,132	1,509	1,794	4,645	4,309	17,648
Driven into yards	23	138	736	56	.....	8	225
Total	361,935	268,236	170,785	169,149	265,259	254,714	1,490,078

SHEEP.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	9,518	9,645	7,041	4,775	1,997	2,383	35,359
Illinois Central Railroad	8,812	6,232	5,390	4,341	2,925	2,786	30,486
Chicago, Burlington and Quincy Railroad	12,336	15,118	13,340	8,285	5,253	4,568	58,900
Chicago and Northwestern Railway	3,965	4,378	6,216	2,096	3,414	1,720	21,789
Chicago and Alton Railroad	3,139	3,030	3,374	4,116	2,184	410	16,253
Pittsburgh, Fort Wayne and Chicago Railroad	185	237	.....	.....	31	102	555
Michigan Central Railroad	318	496	52	473	86	120	1,545
Michigan Southern Railroad	2,140	1,650	1,481	250	187	756	6,464
Pittsburgh, Cincinnati and Saint Louis Railroad	59	.....	.....	82	105	106	352
Chicago, Danville and Vincennes Railroad	1,597	1,017	540	353	207	825	4,539
Driven into yards	.....	.....	736	.....	.....	.....	736
Total	42,069	41,803	38,170	24,771	16,389	13,776	176,978

HORSES.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	104	287	233	162	283	48	1,117
Illinois Central Railroad	126	305	320	251	207	190	1,399
Chicago, Burlington and Quincy Railroad	132	285	573	476	575	248	2,289
Chicago and Northwestern Railway	123	423	408	498	513	347	2,312
Chicago and Alton Railroad	78	71	29	124	50	169	521
Pittsburgh, Fort Wayne and Chicago Railroad	.....	.....	.....	.....	.....	.....	.....
Michigan Central Railroad	.....	16	13	12	35	5	81
Michigan Southern Railroad	14	12	36	6	22	9	99
Pittsburgh, Cincinnati and Saint Louis Railroad	.....	.....	.....	2	.....	.....	2
Chicago, Danville and Vincennes Railroad	.....	1	18	.....	.....	2	21
Driven into yards	.....	.....	.....	.....	.....	.....	.....
Total	577	1,400	1,630	1,531	1,685	1,018	7,841

SHIPMENTS.

CATTLE.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	469	228	221	624	185	722	2,449
Illinois Central Railroad	552	992	1,001	687	371	410	4,009
Chicago, Burlington and Quincy Railroad	541	1,083	580	302	239	726	3,471
Chicago and Northwestern Railway	142	295	470	405	314	425	2,051
Chicago and Alton Railroad	1,032	1,096	207	812	189	1,180	4,516
Pittsburgh, Fort Wayne and Chicago Railroad	11,956	12,826	15,925	16,981	24,615	18,764	101,067
Michigan Central Railroad	3,488	5,539	5,321	7,108	7,041	8,565	37,062
Michigan Southern Railroad	14,511	13,312	19,783	25,466	33,445	21,543	128,060
Pittsburgh, Cintinnati and Saint Louis Railroad	356	775	197	93	40	.....	1,461
Total	33,047	36,146	43,705	52,474	67,039	52,335	284,746

HOGS.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	.....	.....	165	.....	13	.....	178
Illinois Central Railroad	.....	52	.....	.....	.....	.....	52
Chicago, Burlington, and Quincy Railroad	154	.....	.....	.....	183	.....	337
Chicago and Northwestern Railway	.....	56	6	63	219	259	603
Chicago and Alton Railroad	.....	.....	.....	.....	.....	4	4
Pittsburgh, Fort Wayne and Chicago Railroad	8,451	20,223	31,256	37,733	41,662	52,272	191,597
Michigan Central Railroad	30,086	31,463	50,179	54,632	87,326	83,706	337,392
Michigan Southern Railroad	39,646	52,353	62,603	52,723	67,048	70,699	345,072
Pittsburgh, Cincinnati and Saint Louis Railroad	.....	521	.....	.....	.....	.....	521
Total	78,337	104,668	144,209	145,151	196,451	206,940	875,756

SHEEP.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	160	181	.....	196	182	100	819
Illinois Central Railroad	.....	590	.....	.....	.....	.....	590
Chicago, Burlington and Quincy Railroad	.....	.....	.....	165	.....	100	265
Chicago and Northwestern Railway	.....	196	9	21	48	587	861
Chicago and Alton Railroad	.....	52	49	152	.....	355	608
Pittsburgh, Fort Wayne and Chicago Railroad	20,481	18,827	19,796	9,406	2,701	832	72,043
Michigan Central Railroad	2,594	5,244	8,382	871	274	.....	17,365
Michigan Southern Railroad	.....	102	1,259	6,517	2,740	1,519	12,137
Pittsburgh, Cincinnati and Saint Louis Railroad	.....	156	.....	.....	.....	.....	156
Total	23,235	25,348	29,495	17,328	5,945	3,493	104,844

HORSES.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	.....	.....	3	.....	.....	4	7
Illinois Central Railroad	1	10	2	.....	2	.....	15
Chicago, Burlington and Quincy Railroad	4	1	14	6	2	.....	27
Chicago and Northwestern Railroad	16	65	102	53	163	51	450
Chicago and Alton Railroad	22	46	.....	8	20	.....	96
Pittsburgh, Fort Wayne and Chicago Railroad	151	391	248	247	212	245	1,494
Michigan Central Railroad	15	.....	144	174	203	109	645
Michigan Southern Railroad	213	610	957	906	953	512	4,151
Pittsburgh, Cincinnati and Saint Louis Railroad	.....	.....	15	.....	.....	.....	15
Total	422	1,123	1,485	1,394	1,555	921	6,900

MARKET PRICES OF FARM PRODUCTS.

Articles.	August.	September.
NEW YORK.		
Flour, superfine State ..... per barrel	$5 55 to $5 90	5 85 to 6 00
extra State ..... do	6 65 to 7 50	7 00 to 7 90
superfine western ..... do	5 55 to 5 90	5 85 to 6 45
extra to choice western ..... do	6 50 to 10 75	7 00 to 10 40
extra southern ..... do	7 10 to 9 00	7 00 to 9 75
good to choice southern ..... do	9 05 to 12 00	9 80 to 12 35
Wheat, No. 1 spring ..... per bushel	1 50 to 1 52	1 63 to 1 64
No. 2 spring ..... do	1 47 to 1 49	1 60 to 1 62
winter, red, western ..... do	1 60 to 1 69	1 51 to 1 61
amber, western ..... do	1 70 to 1 75	1 62 to 1 72
white, western ..... do	1 70 to 1 85	1 75 to 2 00
Rye ..... do	73½ to 74	75 to 85
Barley ..... do	Nominal.	Nominal.
Oats ..... do	42½ to 48	35 to 49
Corn, new western, mixed ..... do	.....	.....
old western, mixed ..... do	63½ to 64½	64 to 64½
Hay, shipping qualities ..... per ton	20 00 to 21 00	19 00 to 21 00
prime ..... do	24 00 to 31 00	26 00 to 30 00
Pork, mess ..... per barrel	13 50 to 13 65	14 10 to 14 25
prime ..... do	10 50 to 11 00	10 50 to 12 50
Beef, plain mess ..... do	5 00 to 8 00	5 00 to 7 00
extra mess ..... do	7 00 to 10 00	7 00 to 9 00
Lard ..... per pound	8 to 9¼	8½ to 9½
Butter, western ..... do	11 to 16	10 to 15
State dairy ..... do	20 to 26	20 to 26
Cheese, western dairy ..... do	9 to 12	12 to 13½
State factory ..... do	11 to 13	13 to 14½
Cotton, ordinary to good ordinary ..... do	16⅝ to 19	17⅛ to 20¼
low middling to good middli'g ..... do	20⅝ to 23⅝	21⅛ to 24⅝
Tobacco, lugs, all grades ..... do	8½ to 9½	9 to 10¼
common to medium leaf ..... do	9¼ to 10¾	10 to 11¾
Wool, pulled ..... do	30 to 65	.....
tub-washed ..... do	65 to 70	62½ to ———
California, spring clip ..... do	40 to 45	35 to 38
fall clip ..... do	20 to 33	.....
Texas, inferior to common ..... do	18 to 43	.....

Market prices of farm products—Continued.

Articles.	August.	September.
BOSTON.		
Flour, western, superfine ... per barrel	$5 00 to $5 50	$5 50 to $6 00
extras ... do	6 25 to 8 00	6 75 to 7 00
choice ... do	8 50 to 11 50	7 50 to 11 00
southern extras ... do	6 25 to 7 00	6 75 to 7 25
choice Baltimore ... do	10 00 to 11 50	9 50 to 12 00
Wheat ... per bushel	1 60 to 1 80	1 50 to 1 85
Rye ... do	85 to 90	85 to 90
Barley ... do	75 to 1 10	75 to 1 10
Corn, southern yellow ... do	70 to 71	70 to 71
western mixed ... do	67 to 69	68 to 70
western yellow ... do	70 to 71	70 to 71
Beef, mess ... per barrel	10 00 to 12 00	10 00 to 11 00
extra ... do	12 00 to 16 00	11 00 to 15 50
Pork, prime ... do	11 25 to 12 00	11 25 to 12 00
mess ... do	14 00 to 14 50	14 75 to 15 00
Lard ... per pound	9 to 10	9 to 10
Butter, New York and Vermont ... do	18 to 27	15 to 28
Canada, choice ... do	22 to 25	22 to 25
western ... do	12 to 23	12 to 23
Cheese, N. Y. and Vt., choice factory ... do	9 to 12½	13 to 14
Ohio, choice factory ... do	10 to 11½	11½ to 13½
Hay ... per ton	20 00 to 31 00	20 00 to 29 00
Wool, Ohio and Pennsylvania ... per pound	60 to 72	58 to 70
Michigan ... do	58 to 65	57 to 62
other western ... do	57 to 65	55 to 60
California ... do	25 to 55	25 to 32
Texas ... do	35 to 50	35 to 50
combing-fleece ... do	70 to 75	70 to 75
PHILADELPHIA.		
Flour, superfine ... per barrel	4 75 to 5 50	4 50 to 5 50
extras ... do	5 50 to 6 25	5 75 to 6 25
family and fancy brands ... do	7 25 to 10 50	7 00 to 11 00
Wheat, red, Pa. and western ... per bushel	1 65 to 1 70	1 62 to 1 72
amber ... do	1 70 to 1 88	1 75 to 1 82
Rye ... do	80 to ———	74 to ———
Corn, yellow ... do	62 to ———	66 to 67
mixed ... do	61 to ———	64 to 65
Oats, western white ... do	43 to 44	45 to 46
Pork, mess ... per barrel	14 00 to 14 25	15 00 to ———
Beef, mess, city packed ... do	14 50 to 15 00	14 50 to 14 75
Lard ... per pound	9 to 9¼	9 to 9¼
Cotton, middling ... do	21¾ to 22¼	22½ to 23
Hay ... per ton	———	36 00 to 45 00
BALTIMORE.		
Flour, superfine ... per barrel	4 50 to 9 25	5 00 to 8 75
extra ... do	5 70 to 9 00	6 50 to 8 50
family and fancy ... do	8 25 to 12 50	9 00 to 12 00
Wheat, Pennsylvania ... per bushel	———	———
western ... do	1 60 to 1 70	1 60 to 1 65
Maryland ... do	———	———
Rye ... do	60 to 70	75 to 85
Corn, yellow ... do	60 to 64	64 to 65
white ... do	72 to ———	67 to 68
Hay, western ... per ton	34 00 to 35 00	34 00 to 38 00
Pa. and Maryland choice ... do	———	40 00 to 42 00
Pork, mess ... per barrel	14 50 to 14 75	15 00 to ———
Butter, western, prime to choice ... per pound	18 to 22	18 to 22
New York ... do	———	———

Market prices of farm products—Continued.

Articles.	August.	September.
BALTIMORE—Continued.		
Cheese, western factory ..... per pound..	$0 11 to $0 12½	$0 14 to $0 14¾
eastern factory ..... do.....		
Lard ..... do.....	8 to 10½	8½ to 10½
Cotton, ordinary ..... do.....	19¾ to 19¾	20 to ———
middling ..... do.....	21½ to 21¾	21 to 22½
Tobacco, common to good lugs ..per cental..	6 50 to 9 50	6 50 to 9 50
common to medium leaf ....do.....	10 00 to 12 00	11 00 to 12 50
Wool, unwashed, free from burs.....do.....	40 to 42	33 to 35
tub-washed ..... do.....	60 to 62	56 to 57
CINCINNATI.		
Flour, superfine ..... per barrel..	5 25 to 5 75	5 75 to 6 50
extra ..... do.....	7 50 to 7 75	7 35 to 7 50
family ..... do.....	8 00 to ———	7 60 to 8 75
Wheat, No. 1 white ..... per bushel..	1 60 to ———	1 65 to 1 70
No. 2 white ..... do.....	1 55 to ———	
No. 1 red ..... do.....	1 60 to 1 62	1 55 to 1 60
No. 2 red ..... do.....	1 60 to ———	1 50 to 1 55
Corn, white ..... do.....	52 to 53	48 to ———
yellow ..... do.....		46 to ———
Oats, white ..... do.....	36 to ———	41 to ———
No. 1, mixed ..... do.....	33 to 34	32 to 35
Rye ..... do.....	73 to 75	65 to 73
Barley, winter, No. 2 ..... do.....	60 to 70	90 to 1 25
spring, No. 2 ..... do.....	60 to ———	
Hay, timothy, new, com. to choice..per ton...	15 00 to 23 00	
Pork, mess ..... per barrel..	13 00 to 14 50	13 25 to 13 75
prime ..... do.....		
Beef, plate ..... do.....	11 00 to 11 50	9 50 to 10 00
hams ..... do.....	13 00 to 13 50	
Lard, prime, steam ..... per pound..	8¼ to 8⅝	8⅜ to 8⅞
Butter, Western Reserve ..... do.....	20 to 22	20 to 22
choice Central Ohio ..... do.....	18 to 20	
Tobacco, lugs ..... do.....	10 to 18	10 to 18
leaf ..... do.....	12 to 25	12 to 25
Wool, tub-washed ..... do.....	60 to 65	58 to 62
fleece-washed, manufacturing..do.....	55 to 60	48 to 52
fleece-washed, combing ..... do.....	65 to ———	
unwashed, manufacturing.....do.....	40 to 45	36 to 40
unwashed, combing ..... do.....	50 to ———	46 to 48
pulled ..... do.....	53 to 55	37 to 42
CHICAGO.		
Flour, winter, extra ..... per barrel..	7 50 to 10 50	8 50 to 8 75
spring, extra ..... do.....	6 00 to 7 75	5 00 to 6 75
Wheat, No. 1 spring ..... per bushel..	1 33 to ———	1 27 to 1 29
No. 2 spring ..... do.....	1 31 to 1 32	1 22 to 1 23½
No. 3 spring ..... do.....	1 14 to 1 14½	1 15¼ to 1 16
Corn, No. 2 ..... do.....	42 to 42¼	38¼ to 39⅛
rejected ..... do.....	39 to 39½	36½ to 37
Oats, No. 2 ..... do.....	27 to 27½	25 to 25½
rejected ..... do.....	24 to 25	20 to 20½
Rye, No. 2 ..... do.....	60½ to 61	57 to 58½
Barley, No. 2 ..... do.....	50 to 55	47 to 48
Hay, timothy, (on track) ..... per ton..	14 00 to 16 00	14 00 to 19 00
prairie ..... do.....	9 50 to 11 00	9 00 to 11 50
Pork, mess ..... per barrel..	14 00 to 14 12½	14 50 to 15 00
extra ..... do.....		
Beef, mess ..... do.....	9 00 to 10 00	9 00 to 10 00

Market prices of farm products—Continued.

Articles.	August.	September.
CHICAGO—Continued.		
Lard, per pound	$0 8½ to $0 8¾	$0 8¾ to $0 9
Butter, choice dairy, do	18 to 22	21 to 25
fair to good tub and firkin, do	13 to 15	14 to 18
Cheese, New York factory, do	11 to 12	13 to 14
Wool, tub-washed, do	60 to 70	60 to 67
fleece-washed, do	35 to 54	40 to 58
unwashed, medium, do	40 to 43	36 to 40
SAINT LOUIS.		
Flour, superfine, per barrel	———	4 25 to 4 75
extras, do	6 90 to 7 75	5 00 to 6 65
choice, do	8 50 to 9 50	7 00 to 9 50
Wheat, red, per bushel	1 25 to 1 70	1 32 to 1 75
white, do	1 40 to 1 75	1 40 to 1 80
spring, do	———	1 10 to 1 37
Corn, mixed, do	39 to 49	33 to 45
yellow, do	———	36 to ———
white, do	50 to ———	46 to 47
Oats, white, do	39 to ———	31 to 32½
mixed, do	26½ to 38	21 to 30
Rye, do	60 to ———	54 to 57
Barley, winter, do	Nominal.	———
spring, do	Nominal.	40 to 60
Hay, per ton	14 00 to 21 00	14 00 to 22 50
Pork, mess, per barrel	13 50 to 13 75	14 75 to 15 00
Lard, prime steam, per pound	9 to 10	9 to 10¼
kettle, do	———	———
Butter, choice, do	18 to 24	20 to 22
medium to fair, do	12 to 16	16 to 18
Cheese, choice factory, do	10½ to 11	12½ to 13½
Cotton, middling, do	21½ to 22	21½ to 22
Tobacco, lug, per cental	7 50 to 9 00	8 00 to 9 25
common leaf, do	8 50 to 9 50	9 00 to 9 75
medium to good leaf, do	9 50 to 10 50	10 00 to 11 00
Wool, tub-washed, per pound	55 to 60	50 to 58
fleece-washed, do	50 to 60	45 to 48
unwashed medium, do	41 to 43	33 to 37
NEW ORLEANS.		
Flour, superfine, per barrel	5 25 to 5 50	5 75 to 6 00
extras, (according to grade), do	5 75 to 12 50	6 40 to 10 00
Corn, white, per bushel	56 to 57	60 to 62
yellow, do	58 to ———	58 to 60
mixed, do	66 to 68	55 to 60
Oats, do	42 to 46	32 to 40
Hay, choice, per ton	24 00 to 25 00	28 00 to 30 00
prime, do	26 00 to 27 50	27 00 to 28 00
Pork, mess, per barrel	13 75 to 14 00	14 50 to 15 25
Beef, mess, (Texas), do	11 00 to 12 00	11 00 to 12 00
Lard, tierce, per pound	9¼ to 9¾	10 to 12
keg, do	10¾ to 11½	12½ to ———
Butter, choice western, do	17 to 20	18 to ———
Goshen, do	30 to ———	30 to ———
Cheese, choice factory, do	14 to 15	12 to 13
western reserve, do	———	———
New York cream, do	16 to ———	16 to ———
Cotton, ordinary to good ordinary, do	18⅓ to 19¼	18⅞ to 19⅜
middling to good middling, do	19¾ to 20⅓	20⅜ to 21⅛
Tobacco, lugs, do	8⅓ to 9½	8½ to 9½
low-leaf, do	9½ to 10½	9½ to 10½
medium, do	10½ to 11½	10⅓ to 12½

Market prices of farm products—Continued.

Articles.	August.	September.
SAN FRANCISCO.		
Flour, superfine ..... per barrel..	$4 00 to $4 50	$4 00 to $4 25
extra superfine ..... do.....	4 75 to 5 00	4 40 to 4 50
higher grades ..... do.....	5 25 to 6 00	4 75 to 5 75
Wheat, State ..... per cental..	1 50 to 1 65	1 45 to 1 55
Oregon ..... do.....	1 60 to 1 65	1 50 to 1 55
Corn, white ..... do.....	1 60 to 1 65	1 70 to 1 75
yellow ..... do.....	1 55 to 1 60	1 60 to 1 65
Hay, State ..... per ton..	9 00 to 15 00	9 00 to 16 00
Pork, mess ..... per barrel..	17 00 to 20 00	17 00 to 20 00
prime mess ..... do.....	.....	17 50 to 18 00
Beef, mess ..... do.....	12 00 to 14 00	12 00 to 13 00
Lard ..... per pound..	10 to 11¼	10½ to 11½
Butter, overland ..... do.....	18 to 20	22½ to 25
California ..... do.....	25 to 30	25 to 37½
Oregon ..... do.....	15 to 18	29 to ———
Cheese ..... do.....	10 to 15	10 to 15
Wool, native ..... do.....	20 to 30	12 to 25
California ..... do.....	35 to 37½	30 to 37½
Oregon ..... do.....	35 to 40	35 to 38

MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

OCTOBER, 1872.

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1872.

MONTHLY REPORT

DEPARTMENT OF AGRICULTURE,
Statistical Division, October 22, 1872.

SIR: I herewith present, for publication, a statement of the condition of the crops in the first week in October, with results of current investigations in the statistical and other divisions of the Department of Agriculture.

J. R. DODGE, *Statistician.*

HON. FRED'K WATTS, *Commissioner.*

CONDITION OF THE CROPS.

WHEAT.

The New England States fail to report an increase in the product of wheat, with the exception of Maine. In the Middle States the falling off has been quite marked, the crop not having recovered from the effects of freezing in the winter. In the South the product is much larger than usual, both from increase of area and from superior condition. In Missouri, Kansas, Michigan, and Ohio, the crop will be short; in Indiana and Illinois about the same as that of last year. The percentages of States making an increase are as follows, the comparison being with the product of last year: Maine, 109; Virginia, 101; North Carolina, 136; South Carolina, 113; Georgia, 181; Alabama, 133; Mississippi, 101; Texas, 320; Arkansas, 102; Tennessee, 200; West Virginia, 104; Kentucky, 175; Indiana, 101; Wisconsin, 121; Minnesota, 130; Iowa, 112; Nebraska, 140; California, 175; Oregon, 105. A decreased product appears in the following States: New Hampshire, 98; Vermont, 95; Massachusetts, 90; Connecticut, 96; New York, 70; New Jersey, 80; Pennsylvania, 60; Delaware, 75; Maryland, 66; Ohio, 85; Michigan, 86; Illinois, 98; Missouri, 60; Kansas, 80.

Returns from counties reprepresenting two thirds of the production of Maine average 9 per cent. increase over the product of last year. The estimate of Oxford is 115, Penobscot and Somerset 105; Waldo returns 150, York 102, and less important counties range from 90 to 110.

The figures for New Hampshire counties range from 85 to 105, Strafford making the most favorable return and Sullivan the smallest. Hillsborough, Grafton, Belknap, and Coos report 100, Rockingham 90. The average for the State is 2 per cent. less than last year.

Most of the Vermont reports indicate an average production, the lowest return being 75 from Addison, a wheat-growing county. The average is 95 for the State.

Few counties in Massachusetts give much attention to wheat-culture, more than half the total product being grown in Worcester and Franklin, the figures for which are respectively 100 and 75; State average, 90.

The Connecticut average is 96. New Haven and Hartford, among the principal counties, each return 100, and Middlesex 90.

The crop in New York is a short one, the average being 70. Six counties, which usually produce more than a third of the crop of the State, and in 1869 yielded four millions of bushels, are represented as follows: Niagara, 90; Livingston, 50; Ontario, 60; Genesee, 66; Steuben, 78; Seneca, 20. Of twenty-seven counties reporting, representing the larger portion of the crop, eleven return 100 or over, all but one of which are comparatively insignificant in their effect upon the average. Jefferson, which produces nearly a quarter of a million bushels, is represented by 115, the largest estimate reported.

Eleven counties in New Jersey, which grow two-thirds of the wheat in the State, average 80. The large producers are thus returned: Hunterdon, 50; Warren, 60; Salem, 105; and Burlington, 90. The generous and tractable soil of Salem, which has practically great depth without deep plowing, sustains its reputation for reliability under climatic difficulties. Cape May shows an increase in product of 20 per cent., though the amount grown is still small.

Reports from thirty counties in Pennsylvania, which produced about thirteen millions of bushels in 1869, make an average of 60. Lancaster, yielding usually two millions, is placed at 50, and York, where a million bushels are regarded as a small crop, at 42; while Berks gives 60, Franklin 30, Cumberland 100, Westmoreland 93, Lebanon 53, and Bucks 70. These eight counties yielded an aggregate of nearly seven millions of bushels in 1869, or more than a third of the crop of the State, none producing less than half a million of bushels. Only seven counties report 100 or above; Crawford and Forest, 110; Clearfield and Elk, 105; and Cumberland, Montgomery, and Wayne, 100.

The Maryland average is 66, indicating two-thirds of a fair crop. The range of the several counties is from 30 to 115, in Cecil and Montgomery respectively, Charles returning 110; Howard and Caroline, 100; Talbot, 80; Anne Arundel, 75; Frederick and Baltimore, 60; and Carroll, Worcester, and Washington, 50.

In Virginia the average is 101, though the local reports are variable, favorable returns coming from the best lands and well-cultivated fields. The return from Clarke is 60, yet many farms on the Shenandoah yielded well, one field of inferior promise giving 394 bushels upon 24 acres.

We have wheat-returns from forty-six counties in North Carolina, which produce three-fourths of the crop, showing an average increase of 36 per cent. The increase is equivalent to fully a million bushels in the State. The largest percentage of increase appears in Person, Warren, Chatham, Mecklenburgh, Gaston, Rockingham, Clay, Stokes, Stanley, and Montgomery Counties.

The increase appear to be but 13 per cent. in South Carolina, from the counties reported. Reports from thirty-two counties in Georgia, which represent more than half the product of the State, make an average increase of 81 per cent. The same ratio of increase would increase the product more than a million bushels. The increase is heavy in Murray, Fulton, and Milton Counties. Alabama reports indicate an increase of 33 per cent. The crop is scarcely known in Mississippi and Louisiana.

The wheat-reports from Texas are not general, yet they represent

nearly half the crop of the State, and indicate an increasing interest in wheat-growing. Dallas, which yielded 60,000 bushels in 1869, returns a three-fold increase upon last year.

There appears a slight increase of production in Arkansas. In Tennessee, which produces twice as much wheat as all the Gulf-coast States together, an increase of 100 per cent., or fully five millions of bushels, is indicated.

Among the principal counties of West Virginia, Jefferson, Berkeley, and Mason give an increased product, while Marshall returns but 35 per cent. The average is 104. Monroe claims the largest crop in ten years.

The crop of Kentucky was very short last year, which gives a favorable aspect to the present comparisons, the average being 175, and indicating an increase from four millions of bushels to seven. Christian, Shelby, Mercer, Spencer, and other counties claim to have doubled their last production.

Returns from counties producing two-thirds of the wheat in Ohio make an average of 85. Among the counties growing from a half a million to a million bushels, the record stands: Seneca, 90; Miami, 90; Starke, 90; Darke, 80; Butler, 105; Logan, 45; Hancock, 95; Tuscarawas, 90.

A decreased yield of 14 per cent. is apparent in Michigan. Cass, Jackson, Kalamazoo, Van Buren, and Berrien, all large producers, promise enhanced production; Barry, Hillsdale, and Saint Joseph, an amount equal to that of last year; and Lenawee, Ionia, Livingston, Ingham, Genesee, Lapeer, Washtenaw, and Shiawassee, a reduced yield.

Returns from forty-six counties in Indiana, which produced about fifteen millions of bushels in 1869, indicate an average of 101 in comparison with the crop of last year. Of the counties usually yielding not less than half a million of bushels, the following averages are reported: Madison, 120; Shelby and Parke, each 110; Johnson, 100; Saint Joseph, 90; Kosciusko, 80; La Porte, 70. The "best crop in twenty years" is claimed in Daviess. In Clay the thrashers show a variation in the yield from 8 to 27 bushels per acre, and in Wells the range is from 3 to 40 bushels, one field of 25 acres, underdrained, yielding 37 bushels per acre.

Returns representing the larger portion of the crop of Illinois indicate a decrease from last year of 2 per cent. Madison and Saint Clair, together producing nearly three millions of bushels, claim an increase of 10 per cent.; DeKalb, Crawford, and Stephenson make a similar gain; Ogle returns 115, and Madison 110, while Adams, sometimes yielding almost a million bushels, falls 40 per cent. from the aggregate of last year. Sangamon returns 80; Macoupin, 80; Morgan, 75; Bureau, 75; Hancock, 70; while Lee, Winnebago, Hendrickson, among the large producers, report 100.

An increase of 21 per cent. is indicated in Wisconsin over the crop of last year, which was not a large one.

The increase in Minnesota, in counties which produce more than half the crop, is 28 per cent.; in Goodhue county, which yielded 1,815,603 bushels in 1869, the increase on last year is placed at 33 per cent.; in Winona, a county of almost equal importance, 10 per cent.; in Mower 100 per cent. increase. These three counties grew one-fifth of the crop of the State in 1869.

Returns are received from fifty-four counties in Iowa, which produced about nineteen millions of bushels in 1869, which indicate an increase

of 12 per cent. over the crop of last year. Clayton, yielding in the census-year a million bushels, returns 150, and Black Hawk, a still larger producer, reports 90. Only eight counties report decreased production.

The crop in Missouri is very short, promising only 60 per cent. of the last year's product. Nearly every wheat growing county returns a decreased yield—Franklin, 95; Saint Louis, 70; Howard, 60; Johnson, 50; Lincoln, 40; and some as low as 20 and even 10. This comparative failure was caused by winter-killing, aided by the fly and chinch-bug.

The returns from Kansas are less favorable than for several years. The spring-reports of condition were very low, and the chinch-bug has been unusually destructive. After taking into account the increased breadth from extension of settlement, the crop appears to be one-fifth less than that of last year. Bourbon reports nearly a failure; Osage, one-tenth of a crop; Franklin, one-fifth. Marshall reports 15 per cent. more than last year; Butler 25 per cent. increase; and Shawnee, 50. The variation in other counties is almost equally marked. Wheat is scarce, and prices are high.

The enlargement of area in Nebraska will give an increase, as indicated by the counties reported, of 40 per cent.

The crop of California is unprecedented. The increase upon last year's product is estimated at 75 per cent., which will bring the aggregate number of bushels almost up to thirty millions. The yield is large, the area much increased, and the quality of the grain is generally excellent. Monster farms are found in the Sacramento, San Joaquin, and other valleys, one being reported in the San Joaquin of 36,000 acres, another of 23,000, and a third of 17,000. Individual operators are numerous who have from 50,000 up to 1,000,000 bushels of wheat to sell. A great difficulty is experienced in freighting, storing, and shipping the surplus, which undoubtedly exceeds 20,000,000 bushels. Unless owners combine to provide warehousing facilities in the interior, great loss must ensue in the coming rainy season, as it can neither be transported to nor stored in San Francisco before the rains come. In July, August, and September seventy-eight cargoes were shipped to Great Britain, and the shipments of the coming months will only be limited by the number of vessels to be loaded.

The crop of Oregon is an average one, and the quality good.

These figures indicate an increase of about 5 per cent. upon the crop of last year, and promise an estimate, when returns are more fully analyzed, of at least 240,000,000 bushels, against 230,000,000 bushels last year. This result is assured even after a reduction of 35 per cent. is admitted upon the crop of the Middle States and Maryland, which appears to have fallen from 37,000,000 bushels to 24,000,000. An interesting aspect of this season's cropping is the apparent enlargement of the aggregate of the Southern States from 18,000,000 to 27,000,000 of bushels, mainly in Tennessee, Texas, and North Carolina. West of the Mississippi, according to present information, there has been an increase of 15,000,000—say from 70,000,000 to 85,000,000. The central line of wheat production, running north and south, is this year farther west than ever before, and is nearly identical with the ninetieth meridian, which divides centrally the States of Wisconsin and Illinois. Nearly all the wheat produced between this line and the Mississippi River is grown in the western half of Wisconsin and of Illinois. Ere long the quantity grown west of the Mississippi must equal that produced east of it.

MAINE.—*Oxford:* Good; harvested and secured in good condition. *Piscataquis:* Better quality than last year. *Androscoggin:* Very good. *Sagadahoc:* Remarkably good.

MASSACHUSETTS.—*Berkshire:* Acreage small, but the yield would have been excellent but for the storms of August.

RHODE ISLAND.—*Kent:* Spring-wheat from the Department yields a superior crop.

PENNSYLVANIA.—*Washington:* Winter-wheat all got in early, and is needing rain very much; the old crop sells at $1.60 to $1.75 per bushel. *Montgomery:* Wheat in the ground is very promising. *Juniata:* Fultz wheat yielded from 15 to 30 bushels per acre of good quality. It ripens early, and the earlier yielded best. It stood the winter better than it did the late rains. Its culture is increasing. *Lancaster:* Wheat as good as formerly, both in straw and grain. Mr. Jacob L. Minnish, near Ephrata, raised 28 bushels of Fultz wheat to the acre. *Lebanon:* Fultz wheat satisfactory; fall-grain increased 25 per cent. in acreage. *Bucks:* Yields finely as to straw, and is of superior quality. *Beaver:* Yield better than was anticipated. *Butler:* Fultz wheat supplies a great desideratum; its advantages embrace late sowing, early ripening, fair-sized grain, and large yield. *Armstrong:* Quality good in spite of injuries in the shock reducing the condition 5 per cent. *Lawrence:* Showery weather delayed seeding in the first part of September.

MARYLAND.—*Montgomery:* Better yield than was estimated, some farmers getting from 20 to 25 bushels per acre. *Carroll:* Early-sown wheat a failure; late-sown turning out very well. *Howard:* Straw small, but grain-yield surprisingly heavy. *Caroline:* Old wheat held up for high prices; generally sown broadcast, and on corn-land.

VIRGINIA.—*Pulaski:* Injured in the shock by continual rains; much of the crop threshed in a damp state. *Fluvanna:* Average. *Henrico:* Twenty-five per cent. better than last year. *Prince George:* Third of a crop. *Rappahannock:* Quality never better. *New Kent:* Nearly all the wheat of the county grown on two or three large farms. *Essex:* Wheat would have been 25 per cent. above average in spite of drought but for a destructive hail-storm in June; high prices are stimulating this crop. *Highland:* Very fine in some localities; a failure in others. *Clarke:* Not over a half crop; would have been much lower but for extra yields in the Shenandoah Valley; one river-bottom of 24 acres averaged 39.4 bushels per acre of Lancaster wheat, which was not expected to do much; Fultz did well. *Montgomery:* Sowing delayed, and average reduced by drought. *Prince Edward:* Superior in quality to last year's crop and two-tenths larger. *Madison:* Crop better than for many years; quality superior, especially Fultz wheat.

NORTH CAROLINA.—*Forsyth:* Very fine; price $1.25 to $1.35 per bushel. *Harnett:* Injured 10 per cent. by smut. *Alamance:* Above average. *Warren:* Relatively large increase due to the fact that last year's crop was measurably a failure. *Stanly:* Yield abundant; quality fine; Tappahannock and Early Red especially good, better than for several years.

GEORGIA.—*Guinnett:* Crop 50 per cent. better in quantity and quality than last year.

TEXAS.—*Ellis:* An increased area sown; old crop selling at $1 per bushel. *Bexar:* Average yield 22½ bushels per acre. *Upshur:* Crop improved. *Lamar:* Crop 150 per cent. larger than last year; no old wheat on hand.

TENNESSEE.—*Giles:* Greatly injured in the shock. *Loudon:* Seeding delayed by drought. *Madison:* Poorly harvested and secured. *Monroe:* Drought has retarded seeding. *Lincoln:* Double the crop of 1871 and the heaviest ever made in the county; quality excellent. *Greene:* An unusual amount of wheat going to market; price ranging from $1.15 to $1.30 for white, mostly Tappahannock variety. *Fentress:* Above average in quantity and quality. *Humphreys:* Damaged by rain in the shock full 30 per cent; yield 50 per cent. greater than last year; very little old wheat. *Knox:* Farmers behind-hand in seeding; more pains taken in preparing the ground and in selecting seed. *Hancock:* Very good. *Wilson:* Crop exceeds last year's 20 per cent. in quantity and 25 per cent. in quality.

WEST VIRGINIA.—*Jefferson:* No old wheat left; new crop in the ground. *Mineral:* Extra quality. *Kanawha:* Extra good; grain, plump, large, and unusually heavy. *Lewis:* An extra crop put in; weather favorable for seeding. *Monongalia:* Yield one-fourth short, and crop injured in the shock by wet. Wheat brings $1.80 per bushel. *Monroe:* Largest crop in ten years; quality excellent.

KENTUCKY.—*Shelby:* Average yield, 16 bushels against 5½ last year; quality improved 20 per cent. *Nicholas:* Fultz wheat did very well. *Mercer:* Acreage increased 25 per cent. *Clinton:* Larger and better than usual. *Lincoln:* Best crop ever raised; a portion injured by wet. *Livingston:* Very little wheat sown.

OHIO.—*Logan:* Wheat thin on the ground, but the quality excellent. *Defiance:* New crop growing finely. *Noble:* Almost a failure. *Medina:* Beyond expectation; a full average. *Crawford:* Wheat but half a crop, but 20 per cent. better than last year. *Hancock:* The highest yield is 46 bushels per acre. *Portage:* Crop short, but fine. *Vinton:* Too dry for seeding. *Lucas:* Increased acreage sown; coming up finely.

MICHIGAN.—*Cass:* Acreage of winter-wheat largely increased, and new crop sown in remarkably good condition. *Van Buren:* No killing frost; plenty of rain for the past week. *Calhoun:* Average. *Kent:* Crop short, but of excellent quality. *Montcalm:*

Wheat sown from 1st to 15th September; looks better than for five years at this date *Shiawanee:* Crop got in in good season.

INDIANA.—*Owen:* Smaller acreage, but yield equal to last year's; quality depreciated by rains after harvest. *Madison:* Good; an increased acreage sown. *Randolph:* Fultz yielded 2 bushels from 4 quarts of seed; very good yield, considering the drought. *Crawford:* No plowing for wheat till the last week of September. *Whitley:* First killing frost last evening. *Daviess:* Best crop in twenty years. *Kosciusko:* Generally shrunk by hot weather, the straw not being sufficiently ripe to fill the grain. *Jennings:* Very little sown; chinch-bugs at work. *Parke:* Ground in better order and better prepared than usual for seeding; early-sown wheat looks fine. *Pike:* Seeding delayed by drought; usual acreage will be sown. *Hamilton:* Young wheat coming up finely. *Franklin:* Seasonable rains favored seeding; crop starting finely. *Clay:* Threshing out better than was expected; fields averaging from 8 to 27½ bushels per acre; quality reduced in the shock by rains. *Wells:* Remarkably wide range in crops, from 3 to 40 bushels per acre; a field of 25 acres, well underdrained, yielded 37 bushels per acre; the grain was injured in the shock by wet. *Posey:* Averages 25 bushels per acre, and sells at $1.50 to $1.60 per bushel.

ILLINOIS.—*DeKalb:* Wheat, spring and winter, superior in quality; larger breadth sown than for many years; winter-wheat more reliable than spring-wheat. *Marion:* Seeding retarded by drought; acreage reduced 20 per cent. in consequence. *Kankakee:* Spring-wheat but little sown through fear of the chinch-bug; the small acreage of winter-wheat averaged 20 bushels per acre. *Crawford:* Damaged in the shock by wet. *Macoupin:* About the usual area of winter-wheat sown; none broad-cast. *Saint Clair:* Fall seeding in good order. *Bureau:* Culture decreasing; crop good. *Peoria:* Wheat-culture increasing. *Cumberland:* Increased acreage sown. *Hancock:* Acreage increased a third. *Ogle:* But little old wheat; yield better than last year. *Boone:* Spring-wheat in some cases destroyed by chinch-bugs.

WISCONSIN.—*Pierce:* Damp weather injured the wheat after harvest. *Waukesha:* Heaviest wheat raised since 1860, nearly all over 60 pounds per bushel, the standard being 58. *Iowa:* Great variety in local crops; timber-land averages 20 bushels per acre; prairie, not over 10 or 12; bottom, about 7. *Sheboygan:* Injured by rot. *Green Lake:* Yield very unequal on account of the unequal distribution of rain. *Saint Croix:* Greatly injured in the stack by rain and heat.

MINNESOTA.—*Goodhue:* Marked improvement in the yield of spring-wheat. *Houston:* Will average 18 bushels per acre. *Le Sueur:* Damaged 10 per cent. in shock by wet. *Ramsay:* Injured somewhat by damp. *Sherburne:* Unequaled since 1859. *Brown:* Kernel shrunk. *Waterman:* Average yield from 18 to 32 bushels per acre, but quality below last year's. *Mower:* A very large proportion of the crop badly damaged by wet. *Kandiyohi:* Yield of wheat double what it was last year; quality equally good.

IOWA.—*Cedar:* Crop damaged 5 per cent. by excessive rains. *Story:* Injured by storms. *Montgomery:* Averages 22½ bushels per acre; price, 85 cents per bushel. *Allamakee:* High prices caused the farmers to sell out their old wheat. *Harrison:* Injured by falling and spot. *Black Hawk:* Injured by extreme heat before harvest. *Johnson:* crop above average. *Muscatine:* Good in quantity and quality. *Buena Vista:* Partly injured in the shock by wet. *Cass:* Acreage 50 per cent. greater than last year; average yield 25 per cent. greater. *Marshall:* Will average 16 to 18 bushels. *Howard:* Early-sown wheat fared better than any other small grain. *Lucas:* Plowing retarded by drought. *Cherokee:* Averaged from 5 to 30 bushels per acre. *Ray:* The large percentage of the crop is due to the low average of last year. *Mitchell:* Injured in the stack by wet.

MISSOURI.—*Crawford:* Crop greatly injured by chinch-bugs. *Polk:* Injured by chinch-bugs. *Jasper:* Mostly seeded three weeks earlier than last year. *Ozark:* Abundant, and of superior quality. *Boone:* Wheat acreage 35 per cent. below average. *Platte:* Not enough raised to supply home-demand. *Cedar:* Large area sown, with flattering prospects. *Clay:* Not enough raised for seed. *Harrison:* Newly-sown wheat doing well. *Holt:* None but spring wheat raised; crop good; somewhat sprouted in the stack. *Reynolds:* Injured somewhat by chinch-bug. *Saint Clair:* Very poor. *Saint Louis:* Drought has retarded plowing for fall-seeding. *Ralls:* But little choice wheat in the new crop; generally damaged either by severe winter, by fly in the spring, or by chinch-bugs. *Nodaway:* The late crop represented an increased acreage and a growth superior to last year's. *Newton:* Kernel excellent; winter kills Walker wheat less than any other variety; very little, if any, old wheat on hand. *Howard:* Large crop sown; mostly drilled. *Franklin:* Drought caused late seeding. *Taney:* Contrary to expectation, the wheat-crop threshes out better than for seven years, averaging 15 bushels per acre.

KANSAS.—*Morris:* Large breadth of wheat sown. *Nemaha:* Increased acreage of winter-wheat sown; the millers have loaned much seed to farmers to increase the crop. *Bourbon:* Increased acreage sown; seed scarce. *Cherokee:* Good prices have encouraged an increased sowing of wheat, which is generally drilled; market-price, $1.55 per bushel; army-worm has done it some damage, especially on stubble-ground. *Riley:*

Very little winter-wheat; spring-wheat light and poor. *Linn:* Wheat-crop badly injured by chinch-bugs. *Jackson:* Broad area seeded; young crop springing finely. *Coffey:* Season fine for seeding. *Dickinson:* Large breadth sown; ground in excellent condition; young wheat looks splendid. *Miami:* Wheat-sowing lively; broad acreage sown.

NEBRASKA.—*Nemaha:* Threshed out better than was anticipated; spring-wheat generally good, but winter-wheat too often mixed with other grain. *Washington:* Very propitious season; crop averages from 20 to 40 bushels of excellent quality. *Boone:* Exceeds expectations.

CALIFORNIA.—*Plumas:* Crop good, but the grain not so plump as was expected. *Santa Clara:* Not more than half the crop thrashed; great demand for farming land on shares; most of the good wheat held up By farmers for better prices; good milling wheat brings $1.67 to $1.70 per cental; good shipping, $1.62 to $1.65. *Alameda:* Mostly thrashed; yield better than was expected before the harvest; prices falling, through lack of transportation to market. *Stanislaus:* Wheat-crop habitually overestimated by the farmers. *Contra Costa:* Crop quadrupled; some of it shrunk and foul through negligent treatment. *Buena Vista:* Yield better than was expected. *San Joaquin:* Yield 60 per cent. greater than last year, indicating that a wet season is better than a dry one. *Sonoma:* Grain-crops failed on account of excessive rain in winter; increased amount of wheat held over from last year. *Placer:* Full average.

OREGON.—*Lane:* Last year 95 cents per bushel; this year, from 55 to 60 cents. *Grant:* Grain good, but yield reduced. *Washington:* Wheat 65 cents a bushel; last year, $1.25. *Columbia:* Fall-wheat thrashed out better than was expected. *Douglass:* Final product, after thrashing, surprisingly large; condition superior.

DAKOTA.—*Bon Homme:* Superior quality.

UTAH.—*Davis:* Heavy yield; excellent quality; low prices.

The returns of October relate to the condition of the corn-crop, without reference to area or aggregate product. Unusual uniformity appears, only five States falling below average, viz: Delaware, 90; Maryland, 97; Virginia, 92; Florida, 86; and Arkansas, 91. Rhode Island is placed at 100, and every one of the others are above 100, viz: Maine, 108; New Hampshire, 110; Vermont, 113; Massachusetts, 102; Connecticut, 111; New York, 106; New Jersey, 110; Pennsylvania, 107; North Carolina, 110; South Carolina, 103; Georgia, 105; Alabama, 106; Mississippi, 112; Louisiana, 124; Texas, 121; Tennessee, 101; West Virginia, 105; Kentucky, 112; Ohio, 110, Michigan, 104; Indiana, 110; Illinois, 110; Wisconsin, 105; Minnesota, 103; Iowa, 107; Missouri, 107; Kansas, 112; Nebraska, 104; California, 104; Oregon, 103. The average for all the States is 108. This promises one of the largest corn-crops ever produced. The November returns will give the aggregate product upon the total area.

CORN.

MAINE.—*York:* Ripening rapidly. *Cumberland:* Corn-fodder depreciated 20 per cent. by bad weather. *Piscataquis:* Better than for several years. *Oxford:* Best crop in ten years. *Androscoggin:* Very fine. *Waldo:* Very fine.

VERMONT.—*Addison:* Fine, through abundant rains.

MASSACHUSETTS.—*Norfolk:* Very good; ripened well; but slight frosts in the lowlands, which have not affected the crop.

CONNECTICUT.—*New London:* Will average much better than last year, though somewhat injured by heavy rains.

NEW YORK.—*Ulster:* Has had a fine season; wet and hot. *Steuben:* Improved by late rains. *Genesee:* Fair growth of stalks, but a limited growth of ears on account of drought; in some low places the crop is splendid. *Lewis:* Very promising. *Wyoming:* Yield not large, but well matured. *Sullivan:* Never better.

NEW JERSEY.—*Sussex:* Crop seldom, if ever, better. *Gloucester:* Crop unprecedented and out of danger.

PENNSYLVANIA.—*Franklin:* Crop excellent; some fields in the southern part of the county cannot be excelled in the country; yield will be large and of fine quality. *Washington:* Damaged by being blown down. *Montgomery:* Crop both in quantity and quality exceeds any for years. *Lancaster:* Better than for many years. *Armstrong:* Very good and large; mostly saved. *Westmoreland:* A heavy frost (October 1) will cause much soft corn.

MARYLAND.—*Baltimore:* Crop will be full average on well-cultivated fields; culture

in the county generally good, and hence the crop is better than was expected. *Carroll:* Good in the northern, and very good in the southern part of the county, where the drought was most severe. *Montgomery:* Better than was anticipated during the dry summer; deep plowing and fertilizers to some extent counteracted the drought. *Howard:* Crop crippled by cut-worms. *Washington:* Finer than ever along the Pennsylvania line, but short farther south. *Caroline:* Turned out well; 60 bushels per acre; corn-fodder a substitute for hay in many cases. *Anne Arundel:* Good.

VIRGINIA.—Never better; out of danger from frost. *Fluvanna:* Very poor on forest-lands. *Stafford:* Much injured by drought. *Rappahannock:* Crop 25 per cent. above average in spite of drought. *Orange:* Nearly average in spite of drought. *Prince George:* Late-planted corn very much improved; early-planted mostly a failure. *Henrico:* Very short. *Clarke:* Very good in the southern third of the county, but elsewhere below average. *Highland:* Best crop known for many years, in spite of an unfavorable spring and summer. *Chesterfield:* Nearly all secured. *Princess Anne:* Seriously injured by drought. *Essex:* Severely injured by drought. *Lancaster:* Injured by drought. *Madison:* Early corn good; late injured by drought.

NORTH CAROLINA.—*Forsyth:* Very good; price, 65 and 70 cents per bushel. *Gaston:* Promises a very large crop. *Harnett:* Very promising; season favorable. *Franklin:* Escaped the drought. *Rowan:* Injured 10 per cent. by a violent storm on September 8. *Haywood:* Pennsylvania corn has done finely, showing a special adaptation to our climate. *Currituck:* Very fine and well matured. *Davie:* Shortened 10 per cent. by drought. *Alamance:* Above average. *Sampson:* Crop excellent and well saved. *Stanly:* Crop average; bottom-crop, fine; white Roanoke the favorite variety.

SOUTH CAROLINA.—*Orangeburgh:* Very good. *Clarendon:* Below average; less than last year. *Union:* Crop good; dry enough to crib. *Edgefield:* Crop large and in fine condition.

GEORGIA.—*Dooly:* Late crop injured by drought. *Forsyth:* Generally good; on upland about 15 per cent. above average. *Muscogee:* Fair in some localities; poor in others. *Lee:* Better than was expected. *Sumter:* Better than last year, but below average. *Worth:* Better than in 10 years. *Columbia:* Remarkably fine. *Heard:* Better than for several years. *Butts:* Shortened by drought. *Whitfield:* Crop well-matured and larger than was expected. *Twiggs:* Looks well; never of better quality than now.

FLORIDA.—*Jackson:* Only half a crop; not so good as last year. *Orange:* Shortened 40 per cent. by drought. *Jefferson:* Not over two-thirds of an average. *Taylor:* Crop short near the coast; not over 30 or 35 bushels per acre; 20 per cent. better in the northwest part of the county. *Levy:* Injured by drought in May and June; not more than half enough to supply the home demand.

ALABAMA.—*Saint Clair:* Destructive floods in July prevented the finest crop ever made in the county; upland corn good. *Clarke:* Crop light in some places; average in others. *Dallas:* Above average in quantity and quality. *Lee:* Crop much the best since the war. *Blount:* Excessive rains destroyed about half the crop. *Lawrence:* Early corn good; late crop poor. *Chambers:* Ten per cent. above average. *Macon:* Good; enough for home demand. *Limestone:* Better than for several years.

MISSISSIPPI.—*Rankin:* Yellow corn from the Department a success; stalks fine; ears of good size; ripens early. *Tishomingo:* Extra fine; late planting somewhat injured. *Grenada:* Best and largest crop since the war; full average. *Jasper:* Early crop very good; late plantings injured by drought. *Amite:* Made before the drought set in. *Smith:* Full average and of good quality. *Lee:* Made before the drought; a good yield. *Lauderdale:* Crop 25 per cent. above average, but not sufficient to meet home demand; 25 per cent. more must be imported. *Hinds:* Full average. *Jefferson:* Early-planted crop good; out of the way of drought. *Kemper:* More abundant than last year; probably enough for home demand. *Attala:* Good; mostly made before the drought.

LOUISIANA.—*Morehouse:* Extra fine. *La Fourche:* Heavier ears but fewer than last year. *Red River:* Bottom-corn full 50 per cent. better than hill-corn. *Assumption:* Largest crop since the war.

TEXAS.—*Coryell:* Yield fine; average 40 bushels per acre, some farms reaching 75; market price 40 cents. *Smith:* Abundant. *Red River:* Pretty well matured before drought set in. *Medina:* Crop made before the drought set in. *Rusk:* Early-planted bottom-corn doing well. *Upshur:* Better than last year. *Austin:* Very good generally. *Grayson:* Best crop in 10 years; 40 to 60 bushels per acre. *Matagorda:* Shortened by drought.

ARKANSAS.—*Craighead:* A large proportion late, and quite a failure. *Drew:* Mostly gathered; matured before the drought; crop extra, both in quantity and quality. *Jackson:* Greatly shortened by drought; injured seriously by an immense number of squirrels. *Columbia:* Estimates greatly declined since the crop was gathered; nearly all housed. *Sebastian:* Shortened a third by drought, but of excellent quality; early-planted corn has done well, but late-planted amounts to nothing.

Independence: Impaired by drought; late corn a failure. *Woodruff:* Early corn fair; later crops a failure.

TENNESSEE.—*Dickson:* Prospect less hopeful than in September, on account of drought. *Bradley:* Excellent, but slightly injured by drought. *Smith:* Average in spite of drought. *Monroe:* Late corn injured by drought. *Truesdale:* Late corn injured by drought. *Fentress:* One-fourth above average; new corn sells at 25 cents per bushel. *Humphreys:* Late corn damaged by drought. *Gibson:* Late corn shortened by drought. *Jefferson:* Much better than last year. *Hancock:* Very good. *Wilson:* Ten per cent. above average. *Grainger:* Nearly ruined by drought. *Morgan:* Yield less than was expected. *Hardin:* Late crop injured by drought.

WEST VIRGINIA.—*Braxton:* Crop good. *Jefferson:* Crop well matured. *Mineral:* Abundant yield; saved before frost. *Wayne:* Crop beyond expectation. *Jackson:* Never better.

KENTUCKY.—*Shelby:* Early corn matured before the drought set in; late plantings greatly shortened. *Daviess:* Crop will reach 1,250,000 to 1,500,000 bushels. *Clinton:* Excellent. *Adair:* Well matured. *Carroll:* Drought in August and September reduced a very large crop to average.

OHIO.—*Logan:* The best crop for many years. *Defiance:* Crop made. *Hardin:* Brought out finely by late rains. *Franklin:* Never so good or so large in acreage. *Crawford:* Excellent. *Delaware:* Crop 25 per cent. more than any former yield. *Madison:* Never better; hot summer has finely brought out corn; crop large and well matured.

MICHIGAN.—*Cass:* Cut-worms, grub-worms and drought have injured some fine yields of corn. *Jackson:* Yield very large in fields not affected by the worm in the spring. *Emmett:* Harvested in good condition.

INDIANA.—*Owen:* Never before ripened so well; crop fuller and better ripened than for forty years. *Crawford:* Drought will bring a superior corn-crop down to an average. *Whitley:* Well ripened. *Jennings:* Shortened by chinch-bugs. *Laporte:* Injured by drought on sandy land; late rains saved prairie-crops; white-grub injured some fields. *Noble:* Good, except the replanted, which is injured by the grub. *Martin:* Materially shortened by drought in July and August. *Lawrence:* Two months' drought have reduced the yield, yet it will be average. *Hamilton:* Fine crop, well matured. *Franklin:* Nearly safe from frost. *Gibson:* Early-planted very good; never better; late plantings injured by drought.

ILLINOIS.—*DeKalb:* Injured by rain and winds, but the dry fall enables it to recover and, perhaps, to make an average crop in both quantity and quality. *Marion:* Shortened by drought. *Alexander:* Most of the crop was early planted and is good; one-tenth late planted and short. *Carroll:* Market-price, 23 cents per bushel. *Franklin:* Shortened by drought. *Macoupin:* Very abundant. *Bureau:* Exceedingly large, excellent and out of danger. *Morgan:* Season very fine for corn. *Lee:* Out of the way of frost. *Putnam:* Crop heavy and well matured, but very much thrown down by winds and rains. *Winnebago:* Well matured before frost came. *Massac:* Late corn injured by drought. *Ogle:* Very good. *Tazewell:* Largest crop ever raised. *Marshall:* Crop enormous; could not be better. *Douglass:* Will scarce pay for harvesting on account of low prices. *Mason:* Good in spite of chinch-bugs. *Stephenson:* Abundant and fine; out of the way of frost. *Boone:* Very good.

WISCONSIN.—*Clark:* Gathered in good order. *Pierce:* Splendid condition. *Sheboygan:* Good, but less yield than was expected. *Green Lake:* Good. *La Fayette:* Fine; season propitious. *Saint Croix:* The hot weather of August and September brought forward the crop, making it the earliest and best yet raised in the county.

MINNESOTA.—*Blue Earth:* Crop out of the way of frost. *Goodhue:* Crop better than was expected. *Houston:* Out of the way of frost. *Sherburne:* Very fine and out of the way of frost.

IOWA.—*Cedar:* Yield excellent, inducing farmers to feed an extra number of stock. *Story:* Large crop in spite of storms, with not enough hogs to eat it. *Clinton:* Out of the way of frost. *Montgomery:* Fully matured; averages 50 bushels per acre, and brings from 12½ to 20 cents per bushel. *Des Moines:* Late, and damaged by frost. *Johnson:* Average. *Linn:* Injured by the late severe storm; damaged 10 per cent. *Black Hawk:* Best crop ever known. *Muscatine:* Nearly all safe; crop average, though injured by grub-worm. *Mahaska:* Grub-worm cut down the crop 10 per cent. *Cass:* Crop enormous; never better; out of the way of frost; will average 60 bushels per acre. *Floyd:* Crop excellent. *Marshall:* Ripe and heavily-eared. *Howard:* Crop promising, under the fair growing conditions of July and August, and the delay of frost in September. *Cherokee:* Much better than usual; will average 50 bushels per acre. *Henry:* Nearly all safe from frost. *Polk:* Well matured; nearly ready to crib. *Mitchell:* Never finer.

MISSOURI.—*Audrian:* Planted late, but will reach full average if the frost delays a little longer. *Cass:* Fine where the ground was not too wet in plowing-time. *Jasper:* Late corn badly injured by chinch-bugs. *Ozark:* Promising. *Shelby:* Better than usual, though injured by rains. *Platte:* Largest yield for many years, but injured by

a severe storm. *Clay:* Well matured; crop heavy and safe. *Daviess:* Planted late and still quite green; injured slightly by one frost. *Holt:* This is the second of two splendid corn-years; never a failure here. *Reynolds:* Injured by high winds and by chinch-bugs. *Scott:* Early corn a little below average; late almost a failure. *Saint Louis:* crop average; matured early. *Ralls:* Yield large, but not so large as was expected. *Putnam:* Corn 15 cents per bushel. *Phelps:* Greatly damaged by chinch-bug. *Newton:* Full average and in good condition. *Iron:* Injured by drought and chinch-bugs. *Pettis:* Late corn injured by frost.

KANSAS.—*Douglass:* Never better; selling at 20 cents per bushel. *Lincoln:* Corn No. 1. *Nemaha:* Large surplus. *Linn:* Injured by chinch-bugs. *Labette:* Injured 10 per cent. by chinch-bugs.

NEBRASKA.—*Thayer:* Splendid till the grasshoppers appeared. *L'Eau-qui-Court:* Squaw-corn the best planted in the county; ripens too early for grasshoppers, and gives the largest yield per acre. *Nemaha:* Crop saved from frost. *Gage:* Not so good as was expected.

CALIFORNIA.—*Sonoma:* Crop excellent; full 10 per cent. above average.

OREGON.—*Douglass:* Less affected by drought than any other crop; crop unexpectedly large.

ARIZONA.—*Yuma:* Fine.

UTAH.—*San Pete:* Injured by frost, which came three weeks earlier than usual. *Iron:* Injured by frost.

DAKOTA.—*Bon Homme:* Grasshoppers injured the crop, yet the yield will be very large.

COLORADO.—*El Paso:* Damaged by frost.

COTTON.

The cotton prospect has undergone no serious changes since the September report. The weather has been generally favorable for picking. No violent storms are reported, and drought has not prevailed; the rainfall in nearly all the cotton States exceeding two inches in September, Florida alone reporting fully four inches, and Tennessee three. The devastations of the caterpillar have extended farther north, even into North Carolina, and have involved the top crop partially, and in many places wholly. The influence of drought in the later summer months has been cumulative in its effects, and exhausted vitality is more apparent than in September; yet there are districts which report exemption from this premature decay, and promise enhanced results. The effect of fertilizers in advancing the crop in the Atlantic States, and the continued effects of worms and drought in shortening the season of growth, will greatly hasten the close of picking. In some places the crop is already gathered, and in many others the fields will be clean early in November.

The general average of condition is reduced from 91 in the first week of September to 82 in October. In October of last year the average was 76, which was a material reduction from that of the previous month. It will be seen that that condition is placed still higher than in last year's report for October, while the area, according to our June returns, was 13 per cent. greater. The State averages are as follows: Virginia, 87; North Carolina, 90; South Carolina, 86; Florida, 75; Georgia, 88; Alabama, 82; Mississippi, 78; Louisiana, 72; Texas, 85; Arkansas, 75; Tennessee, 90.

The local disparity existing in condition of cotton is perhaps more marked than usual. Of the two counties in Alabama producing most largely, both together yielding one-ninth of the cotton in the State, Montgomery reports 100 and Dallas 50. In Georgia, Dawson County, the first in amount of production, returns 100, while Sumter and Lee Counties, both large producers, give only 66. In Mississippi few prominent counties report high condition: Washington, 66; Madison, 66; Warren, 65; and Hinds, 60; while Noxubee and Claiborne return 100.

A few extracts from correspondence are made :

NORTH CAROLINA.—Blight or rust very general, causing middle and top crops to shed; bolls generally small. *Wake:* Drought, rust, and caterpillars have cut down the crop 25 per cent. below average. *Edgecombe:* Reduced 20 per cent. during September by drought and insects. *Sampson:* Rust and caterpillars will cut down the crop one-fifth. *Hertford:* Drought has caused cotton to shed its leaves, and to open prematurely; picking going forward rapidly and will soon be completed; yield below average in lint, but the increased acreage will bring the aggregate up to last year's.

SOUTH CAROLINA.—*Orangeburgh:* About average. *Clarendon:* Yielding 15 per cent. less than last year; small increase in acreage, but will not raise the yield to average; two-thirds already gathered. *Barnwell:* Crop 15 per cent. greater than last year; nearly all open. *Fairfield:* Shortened 10 per cent. by unfavorable weather. *Union:* Yield above average on good land well cultivated; poor on badly-cultivated land. *Newberry:* Shortened by drought; little over half crop; rust has injured the plant, causing the bolls to open prematurely. *Lexington:* A fourth below average, but in good condition and early gathered. *Edgefield:* Late crop largely burned up; prevailing opinion reduces the estimate too low.

FLORIDA.—*Jackson:* Caterpillar, boll-worm, and drought have seriously injured the crop. *Suwannee:* Greatly injured by caterpillars. *Orange:* Badly injured of late by the caterpillar. *Gadsden:* Ravages of caterpillars have stopped all further fruiting, cutting the crop down 50 per cent. below average. The rapid opening of the bolls has required an equally rapid picking. Ginning and packing press more closely upon the picking than for forty years previous, on account of the pressure of pecuniary obligations of the planters, and through fear of a sudden collapse of prices. *Jefferson:* Greatly injured by caterpillars; crop will probably be housed by the middle of October. *Columbia:* Injured by rust and caterpillars 75 per cent.; open. *Clay:* Shortened a third by caterpillars, yet full average. *Alachua:* Reduced a half by caterpillars. *Levy:* Seriously injured by caterpillars, rust, &c., but nearly double the yield anticipated in August. Good weather for picking, crop being gathered in good condition; quality better than usual, owing to improvement in seed.

GEORGIA.—*Dooly:* Crop shortened a fourth by drought and caterpillars; dry weather will mature it a month earlier than usual. *Worth:* Crop the most promising since the war, but suffering seriously from caterpillars. *Sumter:* Opening earlier and more rapidly than in any year since 1859; top crop on stiff lands almost destroyed by caterpillars. *Lee:* Crop between a half and two-thirds; caterpillars destroying the late-planted, of which the proportion is unusually large; three-fourths of the cotton now open. *Muscogee:* Injured by drought and worms; many bolls small; though they should all open, the yield of lint will be light. *Forsyth:* Never better; promises a good yield. *Calhoun:* Half destroyed by caterpillars. *Columbia:* Seriously injured by drought, rust, worms, &c. *Richmond:* Opening rapidly; late plantings cut off by rust; weed larger, but fruit smaller than usual. *Wilkinson:* Caterpillars, rust, and drought have greatly cut down the crop; nearly two-thirds of it already picked. *Schley:* Shortened by caterpillars and rust. *Marion:* Crop has fallen off 30 per cent. since August 1. *Heard:* Not over half a crop; injured by caterpillars. *Floyd:* Shortened by drought and caterpillars. *Guinnett:* Heavy rains, followed by drought, have caused cotton to shed and the prospect to decline 30 per cent. from the August report. *Clayton:* Crop prospects declined to an average; it is half open, and is being rapidly marketed to meet pecuniary obligations for fertilizers, provisions, &c. *Upson:* Seriously injured by two months' drought and caterpillars. *Chattahoochee:* Injured by drought and caterpillars. *Butts:* Cut down by rust, which appeared about September 3; shortened about a fourth. *Clay:* Shortened by caterpillars; stripped by September 1. *Macon:* Bottom and middle cotton a full average; top crop a total failure; top is about 27 per cent. of the whole. *Chattooga:* Acreage increased, but crop injured by caterpillars and boll-worms so that a good fall season will be requisite to make the yield equal to last year's. *Coweta:* Opening fast; many fields nearly picked. *Madison:* Good average, owing to liberal use of fertilizers. *Putnam:* Reduced 15 per cent. below average since last report. *Wilkes:* Fast shedding leaves and opening bolls prematurely; early gathered and marketed. *Whitfield:* Yield greater than was anticipated, though injured by insects. *Decatur:* Largely destroyed by caterpillars; crop all picked. *Twiggs:* Greatly damaged by drought and caterpillars; three-fourths of the crop open; all will be picked in October. *Fayette:* Picking going on rapidly; crop being placed in the market promptly. *Pike:* Drought has shortened the crop. *Effingham:* Season fine for picking.

ALABAMA.—*Saint Clair:* Worms injured the crop. *Hale:* August 1 the crop was exceedingly promising; August 20 it was swept by caterpillars; not a boll has been made since that date. *Butler:* Destroyed by worms; not a leaf left; will make about half a crop. *Clarke:* Caterpillars, after August 15, destroyed all the leaves, forms, and small bolls; what remained of the cotton opened all at once, necessitating considerable loss in gathering. *Dallas:* Half crop; fine weather for picking; quality superior. *Lee:* Cannot exceed five-eighths of an average; droughts and insects very injurious. *Montgomery:* Greatly cut down by the caterpillar. *Colbert:* An unusual proportion of the crop now open; bad weather and worms have injured it; yield,

however, larger than was anticipated, but will not class so high as last year. *Blount:* Reduced to average by caterpillars which have devoured the leaves; late bolls may not mature, in which case the condition will be still further reduced. *Chambers:* Cut down to an average by caterpillars during September. *Macon:* Crop nearly all open; injured by worms. *Lawrence:* Above a half crop. *Pike:* Injured by rust on uplands, and by army-worms on lowlands, making late crops almost a failure. *Autauga:* Deficiency estimated variously from 40 to 75 per cent.; cotton that did not come up till late in May almost a complete failure. *Perry:* All open, and half gathered; injury from the worms equal to a severe frost; late rains have injured the quality of the lint. *Tuscaloosa:* Greatly injured by drought and worms; the latter eat all the small buds and forms. *Clay:* Worms attacked the crop September 1; acreage increased, hence the crop will be about as large as last year. The fine weather greatly favors its gathering. *Limestone:* Injured by drought, caterpillars and boll-worms.

MISSISSIPPI.—*Jasper:* Drought caused the cotton to shed all its forms and young bolls. Caterpillars, though appearing in July, did not do much damage till towards the close of August, since when they have stripped the crop of all that worms can eat; no cotton made since the 1st of August. *Rankin:* Crop shortened a third by insects; it has had seasonable weather. *Tishomingo:* Bolls have dropped badly; crop not over two-thirds; staple short. *Hancock:* Full average, with a slight improvement in the staple; August and September very favorable to the crop. *Warren:* Crop cut down 35 per cent. by drought, boll-worm, and caterpillar; opening premature and harvest early. *Grenada:* Crop shortened by drought, blight, and worms; will fall short one-fourth. *Amite:* Cotton has shed unusually; cotton-worm has been very disastrous; drought also very injurious. *Wayne:* A third of the early cotton and half of the later lost, worms and drought destroying it. *Smith:* But little more than a half crop; half the bottom crop already open and four-fifths of the upland. The largest portion is upland, all of which will be gathered by the 1st of November. *Washington:* Reduced a third below average by drought and insects. *Leake:* About three-fourths average. *Lauderdale:* Twenty-five per cent. below average; mostly open on the 1st of October; staple fair but seed defective, making a stand difficult to obtain next season. *Lee:* Greatly shortened by drought. *Yalabusha:* Shortened by drought fully a third. *Holmes:* Extensive shedding. *Leflore:* Seriously damaged by drought. *Madison:* Storm knocked off about a fifth of the unpicked cotton, September 25 and 26; crop shed badly on account of drought. *Wilkinson:* Earlier-planted cotton injured by boll-worms; later by caterpillars; both kinds by drought. *Winston:* Injured by excessive rains in August, and by drought and worms in September; from two-thirds to three-fourths of an average crop. *Hinds:* Nearly all gathered; late crops a failure through drought and worms. *Attala:* Crops 40 or 50 per cent. below average; early picked and marketed. *Jefferson:* Ten per cent. less than last year; bulk of the crop picked before October 10; some sections gleaning now. *Kemper:* Very little cotton has matured since August 1; fields look as if a heavy killing frost had fallen. *Claiborne:* Will average about as last year in quantity and quality. *Noxubee:* Nearly all open; stripped of leaves by worms but not materially injured; yield about equal to last year's; fine weather for picking.

LOUISIANA.—*Union:* Crop cannot exceed three-fourths of an average; staple short; absence of rain will enable the planter to market it clean; army-worm destroying trash. *Richland:* Cotton yield about the same as last year. *Morehouse:* Drought has cut cotton short fully one-half. *Tangipahoa:* Drought and caterpillars have reduced the crop one-half; the last pickings will be light and silky. *East Feliciana:* Drought and the army-worm have shortened the crop and damaged the staple. *Iberia:* Shed half its bolls and forms on account of drought. *Caddo:* Mostly open; will be picked early in October. *Concordia:* Drought and caterpillars have greatly shortened the crop, but a fine picking season enables planters to make the best of what is left; it opens faster than it can be picked. *Claiborne:* Reduced by long drought and by caterpillars. *Washington:* Reduced a half by drought and worms. *West Feliciana:* All open and the picking season drawing to a close; crop several weeks earlier than last year. *Ouachita:* Not over a half crop; will all be gathered by October 15. *Red River:* All open; a rain would injure it still further.

TEXAS.—*Coryell:* Almost a failure; crop not over a fourth of an average. No farm in the county will average more than half a bale per acre. This failure is due to drought. *Kaufman:* Acreage doubled, but the crop will be but half average, bringing up the aggregate to about what it was last year. *Burleson:* Crop short, but very clean. *Cherokee:* Drought, since July 5, has cut down cotton to 65 per cent. below average; many fields in the southern part of the county will not yield a bale to ten acres. *Henderson:* Greatly improved by late favorable weather; 15 per cent. above average. *Red River:* Injured badly; black-prairie will yield 1,200 pounds per acre seed-cotton, but timber land will not equal the small yield of last year. *De Witt:* Eaten by worms, yet still of average condition. *Bexar:* Prospect improved somewhat. *Marion:* Greatly shortened by drought. *Rusk:* Opened early in August. *Williamson:* Cotton will average half a bale per acre; nearly all picked, and is being rushed into market. *Upshur:*

Crop injured by drought; perhaps as low as two-thirds of last year. *Austin:* Cotton-fields swept by worms. *Matagorda:* Crop all gathered; generally this requires till the middle of December. *Grayson:* Short one-third from drought. *Hunt:* Drought shortened the July prospects of the crop fully one-half. *Travis:* Season fine for picking, which will be completed this month.

ARKANSAS.—*Craighead:* Cotton very short. *Monroe:* Injured by drought; bottom crop tolerable, but the middle and top crops scarcely worth picking; fully half the cotton is open and a very large proportion has been picked; the crop will nearly all be in market by Christmas. *Bradley:* Damaged by drought. *Drew:* Finest crop prospects ruined since midsummer by drought and worms. *Jackson:* Shortened by drought. *Columbia:* Crop about half of last year's. *Crittenden:* Seriously damaged by drought. *Prairie:* Cut down to half a crop by drought; all will be picked by November 1st. *Sebastian:* Crop good as to lint and texture but cut short a third; no top cotton; average so increased that the aggregate yield will not fall short of last year's. *Woodruff:* Shortened a third. *Marion:* Drought has affected the cotton crop. *Montgomery:* Shortened by drought; half picked already; not over 500 pounds seed-cotton per acre. *Independence:* September drought told fearfully upon cotton; no bolls formed in that month while those of August perished; crop 40 per cent. below average; no better in any county within one hundred miles.

OATS.

The product of oats is apparently increased, as compared with that of last year, by about 3 per cent., but it will not equal the aggregate of the census-year. Completed calculations may slightly modify the present aggregate of 265,000,000 bushels. The comparison with last year is as follows: Maine, 119; New Hampshire, 98; Vermont, 113; Massachusetts, 95; Rhode Island, 105; Connecticut, 111; New York, 96; New Jersey, 80; Pennsylvania, 100; Delaware, 60; Maryland, 78; Virginia, 76; North Carolina, 130; South Carolina, 92; Georgia, 120; Florida, 90; Alabama, 97; Mississippi, 99; Louisiana, 105; Texas, 116; Arkansas, 107; Tennessee, 124; West Virginia, 98; Kentucky, 109; Ohio, 93; Michigan, 96; Indiana, 111; Illinois, 112; Wisconsin, 105; Minnesota, 108; Iowa, 100; Missouri, 122; Kansas, 150; Nebraska, 136; California, 103; and Oregon, 101.

MAINE.—*Androscoggin:* Very good. *Piscataquis:* Very good quality. *Oxford:* Good crop, well secured.

MASSACHUSETTS.—*Norfolk:* Above average in quantity and quality. *Berkshire:* Injured by storms requiring it to be mowed like hay.

RHODE ISLAND.—*Kent:* Rusted and blighted; not worth cutting.

NEW YORK.—*Ulster:* Too wet and hot for oats. *Madison:* Crop good, but injured in the shock by rains. *Genesee:* Grain shrunken by drought. *Sullivan:* A good yield though damaged by bad weather at harvest.

PENNSYLVANIA.—*Lancaster:* Equal in quantity to last year, and heavier. *Armstrong:* Injured 5 per cent. in the shock, yet good. *Centre:* Damaged by damp. *Elk:* Dampness reducing the quality of oats.

VIRGINIA.—*Rappahannock:* A great failure. *Essex:* Raised in but small quantities, owing to repeated failures. *Chesterfield:* A large acreage sown in oats. *Highland:* Much shortened by drought. *Clarke:* Schonen oats, though crippled by drought, are much better than common oats on the same farm. *Nansemond:* Oats nearly average, but shortened by drought. *Madison:* Very indifferent; Schonen ruined by storms.

NORTH CAROLINA.—*Forsyth:* Never better; price 50 cents per bushel. *Franklin:* Good. *Alamance:* Above average. *Stanly:* Injured by drought.

GEORGIA.—*Gwinnett:* Oats 50 per cent. better than last year, both in quantity and quality.

FLORIDA.—*Levy:* Seriously injured by drought in May, but the increased acreage will bring up the aggregate yield to last year's; seed-oats are worth $1.50 to $2 per bushel.

MISSISSIPPI.—*Smith:* Materially injured by drought.

TENNESSEE.—*Giles:* Greatly injured in the shock. *Dickson:* Shortened by drought. *Hancock:* Good crop. *Jefferson:* Better than last year's. *Wilson:* About average.

KENTUCKY.—*Lincoln:* Average.

OHIO.—*Medina:* Crop smaller than indicated by previous appearances.

MICHIGAN.—*Emmett:* Oats rotting in the stack and on the ground.

INDIANA.—*Owen:* Very fine up to harvest; enormous in quantity but depreciated in

quality by rain. *Daviess:* Best crop in twenty years. *Kosciusko:* Cut down by drought to a half crop.

MINNESOTA.—*Goodhue:* Marked increase in yield.

ILLINOIS.—*Carroll:* Injured somewhat by the army-worm; market-price 17 cents per bushel. *Crawford:* Damaged in the shock by wet. *Bureau:* Heavy crop. *Peoria:* Heavy yield but damaged by rain at harvest. *Putnam:* Crop large but damaged by rain at harvest. *Douglass:* Did not pay for harvesting. *Ogle:* Injured by the army-worm, (*Leucania unipuncta*) *Boone:* Increased acreage but inferior in quality.

IOWA.—*Story:* Injured by storms. *Montgomery:* Bring only 8 to 17 cents per bushel; demand only local. *Harrison:* Crop heavy but considerably fallen. *Muscatine:* Crop enormous; grain good. *Howard:* Growth abnormally stimulated by alternate damp and heat, hence the grain is badly shrunken. *Mitchell:* Fair crop harvested, but not so large as was anticipated.

MISSOURI.—*Cass:* Mostly spoiled in the shock by heavy rains. *Ralls:* Quite favorable. *Putnam:* Oats 15 cents per bushel. *Newton:* Increased acreage; larger yield and better quality than last year.

KANSAS.—*Douglass:* Good; selling at 15 to 20 cents per bushel. *Lincoln:* Nearly as good as last year. *Riley:* Large acreage; yield light but of good quality.

NEBRASKA.—*Nemaha:* Large acreage and an extraordinary crop. *Washington:* Very good; largest crop for many years. *Boone:* Surpasses expectation.

OREGON.—*Curry:* Crop remarkably heavy.

BARLEY.

The barley product is slightly above that of last year in all the Western States except Missouri, Ohio, and Indiana, and is also increased in Tennessee and Texas. A decrease is apparent in all the Atlantic States. The indications scarcely favor as large a total aggregate as last year. The principal producers are California, New York, Illinois, Iowa, Wisconsin, and Ohio. The quality is also below average in most of the States. The States reporting less than 100 are: New Hampshire, 96; Vermont, 93; Massachusetts, 99; Rhode Island, 95; New York, 94; Pennsylvania, 96; Maryland, 86; Georgia, 91; Ohio, 90; Indiana, 92; Missouri, 93. Those returning 100 are: Connecticut, Kentucky, and Michigan. States above 100: Maine, 120; Texas, 122; Tennessee, 105; Illinois, 101; Wisconsin, 101; Minnesota, 102; Iowa, 104; Kansas, 110; Nebraska, 123; California, 121; Oregon, 118.

RYE.

The rye crop appears to be smaller by 2 per cent. than that of last year. The quality is generally good, though slightly below average in New Hampshire, Vermont, Massachusetts, New York, Pennsylvania, Maryland, South Carolina, Ohio, Michigan, Minnesota, Iowa, and Missouri. The comparative production is thus stated: Maine, 102; New Hampshire, 99; Vermont, 92; Massachusetts, 97; Rhode Island, 94; Connecticut, 105; New York, 93; New Jersey, 88; Pennsylvania, 92; Delaware, 106; Maryland, 100; Virginia, 95; North Carolina, 107; South Carolina, 109; Georgia, 135; Florida, 80; Alabama, 95; Mississippi, 90; Louisiana, 100; Texas, 113; Arkansas, 100; Tennessee, 107; West Virginia, 104; Kentucky, 150; Ohio, 94; Michigan, 95; Indiana, 97; Illinois, 101; Wisconsin, 96; Minnesota, 111; Iowa, 100; Missouri, 80; Kansas, 95; Nebraska, 95; California, 109; and Oregon, 98.

POTATOES.

The potato crop will be comparatively short. The only States indicating average condition are North Carolina, Texas, Arkansas, Kentucky, Illinois, Iowa, Wisconsin, and Minnesota. Rot has appeared again in many portions of the New England States; the Colorado beetle,

though kept under by the suggestions of the entomologists and "eternal vigilance" on the part of the grower, has been marching eastward, and is at work in Pennsylvania and West Virginia; and drought has injured late potatoes in the central parts of the West.

MAINE.—*Penobscot:* Crop rotting considerably. *York:* Few and rotting badly. *Androscoggin:* Light crop and rotting badly. *Waldo:* Almost a failure from rust and rot. *Piscataquis:* Small and rotting badly. *Lincoln:* Ruined by rain; rotting badly. *Oxford:* Poor and rotting badly; digging delayed by rain. *Cumberland:* Loss by rot 25 per cent. *Sagadahoc:* Rotting badly; later plantings almost a failure.

NEW HAMPSHIRE.—*Strafford:* Strong indications of the potato rot. *Hillsborough:* Rotting badly through excessive rains. *Belknap:* Failure through damp weather.

VERMONT.—*Franklin:* Crop light and rotting. *Addison:* Three-fourths destroyed by rot. *Chittenden:* Rotting badly.

MASSACHUSETTS.—*Norfolk:* Early varieties yielded largely but were of inferior quality. *Middlesex:* Too hot and wet for potatoes; some rot.

CONNECTICUT.—*New London:* Early potatoes yield well; later varieties not so well.

NEW YORK.—*Ulster:* Season too wet and hot for potatoes. *Steuben:* Improved by late rains. *Lewis:* Very promising; early crops fine. *Jefferson:* Sound and fair.

PENNSYLVANIA.—*Cumberland:* Condition equal to last year, but the yield smaller. *Franklin:* Late potatoes suffering; Peerless the most successful variety. *Washington:* Early crop not so good; bugs plenty in some places. *Bucks:* Average in quantity, but below average in size. *Armstrong:* Extra good and large. *Elk:* Rotting considerably. *Clearfield:* Doubtful condition; some good, some indifferent.

MARYLAND.—*Baltimore:* Much reduced by drought, but of good quality. *Howard:* Shortened by drought. *Cecil:* Early potatoes very small. *Anne Arundel:* Destroyed by drought.

VIRGINIA.—*Rappahannock:* Half crop. *Prince George:* Very indifferent; sweet potatoes, average. *Essex:* Injured by drought. *Princess Anne:* Sweet-potatoes seriously injured. *Highland:* Very good. *Clarke:* A failure in two-thirds of the county. *Northampton:* Short crop anticipated. *Elizabeth City:* Very poor, on account of drought. *Madison:* Below average; sweet-potatoes above.

NORTH CAROLINA.—*Gaston:* Very fine. *Greenville:* Sweet-potatoes greatly shortened by drought. *Craven:* Army worms in cotton. *Greene:* Sweet-potatoes doing well; with a late fall they will be an average crop. *Warren:* Crop large, fine, and secured in good condition.

SOUTH CAROLINA.—*Orangeburgh:* Inferior. *Richland:* Badly affected by early and late drought. *Lexington:* Sweet-potatoes injured by drought.

GEORGIA.—*Dooly:* Injured by drought. *Marion:* Sweet-potatoes injured by drought. *Murray:* Short.

FLORIDA.—*Jackson:* Sweet-potatoes short from late planting. *Clay:* Sweet-potatoes injured by drought. *Taylor:* Very fair crop. *Levy:* Sweet-potatoes injured by caterpillar and drought, but the increased acreage will bring the yield up to last year's.

MISSISSIPPI.—*Smith:* Sweet-potatoes shortened by drought. *Wilkinson:* Sweet-potatoes cut short by drought.

LOUISIANA.—*Morehouse:* Sweet-potatoes almost a failure. *Washington:* Much injured by drought.

TEXAS.—*De Witt:* Sweet-potatoes very poor. *Medina:* Sweet-potatoes shortened by drought. *Marion:* Greatly shortened by drought. *Rusk:* Too dry for sweet-potatoes. *Austin:* Sweet-potatoes a failure. *Upshur:* Crop injured 10 per cent. by drought. *Kendall:* Prospects for sweet-potatoes not flattering.

TENNESSEE.—*Dickson:* Shortened by drought. *Monroe:* Injured by drought. *Bradley:* Almost a total failure on high ground. *Lincoln:* Injured by drought. *Humphreys:* Potatoes full average, though late crops a failure. *Stewart:* Very short through drought. *Morgan:* Injured by drought. *Hardin:* Potatoes and sweet-potatoes shortened by drought. *Wilson:* Potatoes the finest crop ever raised; sweet-potatoes damaged by drought.

WEST VIRGINIA.—*Jefferson:* Rapidly improving. *Wayne:* Crop beyond expectation.

KENTUCKY.—*Daviess:* If frost keeps off twenty days, our potato-crop will be three times last year's.

OHIO.—*Noble:* Late planted injured by drought; Colorado beetle destructive. *Washington:* Peachblows withered; vines died and the tubers very watery and poor. *Medina:* Not equal to last year; Early Rose especially shortened by drought but of good quality; other varieties inferior in quality. *Franklin:* Late potatoes a failure through drought and the Colorado beetle. *Hardin:* The crop greatly benefited by late rains. *Crawford:* Excellent. *Delaware:* Unusually good. *Portage:* Under aver-

age on account of the intense heat of August. *Hamilton:* Late crop destroyed by the Colorado beetle.

MICHIGAN.—*Cass:* Bad failure through drought and the bugs. *Shiawassee:* Injured by bugs; late varieties improving under the fine rains.

INDIANA.—*Perry:* Crop lost beyond hope. *Kosciusko:* Early potatoes fine; late ones not worth digging. *Switzerland;* Late potatoes shortened by drought. *Pike:* Shortened by drought. *Martin:* Late potatoes shortened by drought. *Gibson:* Early Rose and Shaker Russet potatoes very good. *Lagrange:* Cut down by potatoe-bugs to half a crop.

ILLINOIS.—*Alexander:* Early plantings fine in quantity and quality; later shortened by drought. *Franklin:* Injured by drought; only early plantings a success. *Bureau:* Sweet-potatoes very poor. *Lee:* Very light. *Tazewell:* Largest crop yet raised.

WISCONSIN.—*Clark:* Very little rot among potatoes. *Sheboygan:* Good; better than was expected, *La Fayette:* Fine; season propitious.

MINNESOTA.—*Ramsay:* Very much injured by Colorado beetles.

IOWA.—*Harrison:* Short in yield and size; sweet-potatoes do well; culture increasing. *Johnson:* Below last year's crop, but the acreage exceeds that of any former year. *Muscatine:* Full crop. *Mitchell:* Excellent.

MISSOURI.—*Cass:* Quality good, but few in a hill. *Ozark:* Injured by Colorado beetle; sweet-potatoes below average. *Reynolds:* Potato bugs active. *Phelps:* Late potatoes injured by dry weather. *Perry:* Late potatoes almost a failure.

KANSAS.—*Douglass:* Good; bringing 20 to 30 cents per bushel. *Lincoln:* Crop No. 1. *Jackson:* Sweet-potatoes the finest yet known. *Cloud:* Sweet-potatoes killed by frost September 22.

NEBRASKA.—*Gage:* Potatoes poor.

OREGON.—*Tillamook:* Total failure; disease prevailing, similar to the great potato-rot of twenty-three years ago. *Curry:* Greatly damaged by bugs.

FALL FEED AND PASTURES.

MAINE.—*Penobscot:* Fall feed remarkably good. *Oxford:* Pastures and fields as green as in June, but little grass cut. *Lincoln:* Fall feed fine. *Piscataquis:* Hay-crop large. *Waldo:* Fall feed never better. *Sagadahoc:* Fall feed luxuriant; cattle in fine condition.

NEW HAMPSHIRE.—*Hillsborough:* Pastures very fine.

VERMONT.—*Addison:* Pastures very fine. *Chittenden:* First crop of hay largely uncut.

MASSACHUSETTS.—*Norfolk:* Pastures never better; second hay-crop very heavy, but constant rains have given but poor opportunities of curing it. *Plymouth:* Hay-crop very large, but a large portion of the second cutting imperfectly cured on account of rain; abundant stock of winter fodder; fall pastures fine. *Middlesex:* Second grass-crops heavy; pastures very fine.

RHODE ISLAND.—*Kent:* Fall feed abundant.

CONNECTICUT.—*Middlesex:* Fall feed very abundant.

NEW YORK.—*Columbia:* Frequent showers have kept fall pastures and meadows in fine condition. *Genesee:* Shortened by drought. *Niagara;* Feed short. *Ontario:* Fall feed plenty. *Allegany:* Grass much better than last year.

NEW JERSEY.—*Gloucester:* Second hay-crop, with crab-grass, has brought the grass-crop to a full average.

PENNSYLVANIA.—*Beaver:* Pastures improved by late rains.

MARYLAND.—*Carroll:* Clover-seed good in the northern part of the county, but poor in the southern part where the drought was severe; hay a half crop. *Howard:* Abundant rains have finely brought out fall pastures. *Cecil:* Late rains have greatly improved fall pastures.

VIRGINIA.—Pastures dried up. *Stafford:* Pastures injured by drought. *Rappahannock:* Late rains have made crab-grass very abundant. *Essex:* Short pasturage. *Princess Anne:* Poor stand of young clover, it having died out by reason of dry weather. *Campbell:* Late rains have made better pastures and fatter cattle. *Fairfax:* Fall pastures fine, enabling cattle to commence winter in better condition. *Prince William:* Greatly improved by August rains, making fall feed very plenty to partially compensate for a deficient hay-crop. *Lancaster:* Pastures very indifferent.

GEORGIA.—*Gordon:* Crab-grass and hay very fine. *Whitfield:* Fall pastures poor.

LOUISIANA.—*Tangipahoa:* Hay-crop greatly shortened by drought.

TEXAS.—*Smith:* Grass nearly dried out. *Harris:* Grass nearly dead. *Medina:* Prairie pastures but 15 per cent. of an average; mountain pastures better. *Nueces:* Cattle on the ranges much poorer than last year; pastures shortened by drought. *Live Oak:* Grass burned up.

TENNESSEE.—*Giles:* Pastures dried up. *Gibson:* Stock in bad condition; pastures dried up. *Hancock:* Hay and pasture excellent.

WEST VIRGINIA.—*Braxton:* Pastures fresh and good. *Jefferson:* Warm, wet weather

has greatly improved fall pastures. *Morgan:* Fall pastures fine; cattle consequently greatly improved. *Monroe:* Cattle fat.

KENTUCKY.—*Nicholas:* Pastures burned up; grass scarce. *Daviess:* Fall pastures short, but reviving under late rains. *Clinton:* Plenty of fall feed. *Lincoln:* Short pastures.

OHIO.—*Defiance:* Fall pastures doing finely. *Hardin:* Late rains have finely brought out fall pastures; hay crop light; second crop of clover good—heavier than the first. *Crawford:* Pastures good, and cattle fat. *Madison:* Pasture never better. *Warren:* Pastures excellent. *Fayette:* Fall pasture drying up.

MICHIGAN.—*Shiawassee:* Hay crop better than was anticipated; supply ample.

INDIANA.—*Perry:* Literally burned up. *Miami:* Hay our only crop below average. *Hamilton:* Fall pastures fine. *Franklin:* Pasture abundant.

ILLINOIS.—*De Kalb:* Pasturage very fine; hay crop large and of superior quality *Alexander:* Hay thin and light; pastures enlivened by late rain. *Lee:* pasture splendid. *Boone:* Pastures excellent.

WISCONSIN.—*La Fayette:* Fall pastures fine; cattle fat.

MINNESOTA.—*Le Sueur:* Hay very much damaged. *Ramsay:* Hay injured by wet in the stack. *Winona:* Wet season made the grass coarse and succulent.

IOWA.—*Montgomery:* Sufficient hay for winter-feeding secured before frost. *Clinton:* The largest crop of fall grass known.

MISSOURI.—*Harrison:* Pasturage good. *Ralls:* Cattle in fine condition for fattening. *Lincoln:* Cattle in fine condition.

KANSAS.—*Douglass:* Hay-crop very heavy. *Coffee:* A large amount of prairie-hay gathered.

CALIFORNIA.—*Del Norte:* Pastures very short. *San Joaquin:* Pastures good; cattle in better condition than last year on hay and grain.

OREGON.—*Grant:* Fall pastures greatly improved by early rains in September; to this is attributed a great improvement in beef-cattle. *Columbia:* Pastures not near so good as usual; cattle beginning to fall off. *Douglass:* Pastures short; stock not doing well in consequence. *Tillamook:* Pastures overstocked and cattle depreciating. *Curry:* Pastures very short.

UTAH.—*Rich:* Native grasses very abundant; large quantities of hay stored for winter.

ARIZONA.—*Yuma:* Pastures fine; better than for years.

WASHINGTON.—*Walla-Walla:* Grass starting finely from recent rains.

Table showing the condition of the crops, &c., on the 1st day of October, 1872.

STATES.	WHEAT.		RYE.		OATS.		BARLEY.		BUCK-WHEAT.	CORN.	POTATOES, (*Solanum tuberosum*.)—Average condition October 1.	POTATOES, (*Batatas edulis*, sweet.)—Average condition October 1.
	Product compared with last year.	Average quality compared with last year.	Product compared with last year.	Average quality compared with last year.	Product compared with last year.	Average quality compared with last year.	Product compared with last year.	Average quality compared with last year.	Average condition October 1.	Average condition October 1.		
Maine	109	99	102	102	119	104	120	103	98	108	70	.....
New Hampshire	98	100	99	98	98	93	96	95	82	110	77	.....
Vermont	95	89	92	95	113	86	93	91	96	113	64	.....
Massachusetts	90	90	97	97	95	98	99	94	97	102	97	.....
Rhode Island	.....	.....	94	102	105	100	95	100	.....	100	85	.....
Connecticut	96	98	105	106	111	109	100	100	94	111	91	.....
New York	70	88	93	98	96	93	94	91	91	106	95	.....
New Jersey	80	102	88	101	80	93	.....	.....	95	110	79	91
Pennsylvania	60	94	92	98	100	97	96	95	95	107	94	101
Delaware	75	110	106	100	60	77	.....	.....	109	90	47	87
Maryland	66	102	100	97	78	92	86	92	100	97	67	92
Virginia	101	107	95	102	76	92	.....	.....	97	92	79	88
North Carolina	136	123	107	103	130	122	.....	.....	97	110	102	95
South Carolina	113	110	109	99	92	92	.....	.....	55	103	93	87
Georgia	181	123	135	105	120	110	91	103	103	105	92	90
Florida	.....	.....	80	100	90	102	.....	.....	.....	86	83	95
Alabama	133	120	95	103	97	103	.....	.....	.....	106	92	90
Mississippi	101	103	90	105	99	91	.....	.....	.....	112	89	79
Louisiana	.....	.....	100	.....	105	103	.....	.....	.....	124	73	55
Texas	320	128	113	102	116	105	122	105	.....	124	106	70
Arkansas	102	105	100	101	107	101	.....	.....	.....	91	101	80
Tennessee	200	108	107	108	124	108	105	96	92	104	93	93
West Virginia	101	104	104	102	98	96	.....	.....	97	105	93	96
Kentucky	175	112	150	111	109	103	100	101	102	112	105	104
Ohio	85	100	94	98	93	89	90	95	94	110	88	94
Michigan	86	95	95	98	96	94	100	99	95	104	82	93
Indiana	101	100	97	101	111	98	92	97	88	110	95	96
Illinois	98	101	101	101	112	98	101	97	95	110	103	95
Wisconsin	121	102	96	100	105	97	101	98	96	105	106	.....
Minnesota	128	99	111	99	108	106	102	94	100	103	110	.....
Iowa	112	101	100	99	100	99	104	96	95	107	103	98
Missouri	60	98	80	99	122	106	93	96	98	107	97	100
Kansas	80	93	95	101	150	101	110	97	91	112	99	98
Nebraska	140	102	95	105	136	109	123	110	100	104	95	97
California	175	102	109	100	103	104	101	100	.....	104	97	103
Oregon	105	101	98	100	101	103	118	100	101	103	87	.....

Condition of the crops, &c., on the 1st day of October, 1872—Continued

STATES.	TOBACCO.	BEANS.	PEASE.		SORGHUM.		COTTON.	OLD WHEAT.	FATTENING CATTLE.	
	Average condition October 1.	Average condition October 1.	Acreage compared with last year.	Average condition October 1.	Average condition October 1.	SUGAR-CANE, (not sorghum.)—Average condition October 1.	Average condition October 1.	Average am't of old wheat compared with last year.	Average number of fattening cattle compared with last year.	Average condition October 1 compared with last year.
Maine		102	101	100				97	58	127
New Hampshire		103	98	100				100	92	111
Vermont		73	102	88				99	101	121
Massachusetts	78	98	92	90				102	95	108
Rhode Island		100	100	100					92	100
Connecticut	95	97	101	96	100			100	101	103
New York		99	98	95				82	101	106
New Jersey		94	100	105				86	95	100
Pennsylvania	105	100	100	100				73	96	106
Delaware		100	100	100	87			77	100	97
Maryland	102	98	100	100	105			78	92	97
Virginia	103	94	91	94	91		85	92	97	99
North Carolina	105	104	106	105	93		90	83	102	106
South Carolina		91	100	88	92	95	76	100	102	113
Georgia	105	102	113	95	105	99	78	95	103	101
Florida			93	97		95	75			
Alabama	90	105	98	96	97	98	82	106	101	101
Mississippi	106	90	91	79	95	90	78	83	102	97
Louisiana		75	102	78		83	72		94	85
Texas	99	89	97	76	102	96	85	99	106	97
Arkansas	100	92	80	76	88		75	112	101	97
Tennessee	97	93	100	98	101		90	70	102	99
West Virginia	102	99	100	99	91			74	104	107
Kentucky	101	104	103	102	100			96	100	104
Ohio	106	101	100	98	90			88	102	103
Michigan		98	102	97	100			94	102	101
Indiana	97	100			94			74	97	107
Illinois	99	97	99	99	97			83	100	103
Wisconsin	95	100	99	96				65	100	101
Minnesota		97	100	93	102			80	104	102
Iowa	97	102	103	96	98			79	111	101
Missouri	103	99	97	95	90		93	61	104	105
Kansas	99	95	96	100	99			62	119	104
Nebraska		100			110			69	119	101
California		101	93	93				101	114	105
Oregon		99	94	102				80	99	98

CULTIVATION AND HYBRIDIZING OF WHEAT.

By the Commissioner of Agriculture.

I have heretofore taken occasion to draw the attention of farmers to the fact that, in the midst of the decided progress which is being made in knowledge, which is necessarily the result of experience, and notwithstanding the great advantages which are afforded by the superior skill with which improved implements are used, the wheat crop of the country has depreciated, certainly in quantity, and, perhaps, to some extent in quality. Wheat is justly estimated, as to its relative value, as a primary article of production, as well as a profitable result of industry. It behooves, therefore, all who are concerned in the production or use of this valuable cereal to consider well all the circumstances which affect its quantity or deteriorate its quality.

This paper is indited for the purpose of making two suggestions, each of which I commend to the serious consideration, and criticism, too, of all who take any interest in the subject.

The only marked change which has occurred in the routine of cultivation in the Northern and Middle States, and which is, doubtless, being followed in the Western States, is the abandonment of the use of rye as a rotating crop. This has undoubtedly been produced by the conviction that a second crop of wheat, which has lately become almost universal, is more profitable than to follow wheat with rye. This is, perhaps, a short-sighted view of the subject, for while the second crop of wheat may produce more money than the crop of rye, the ultimate profit to the farmer is exceedingly questionable. In drawing upon the land for a second crop of wheat, you again call upon it for that which you have already taken; you call upon it to perform a work in which it has been already engaged for nearly a whole year. To use an appropriate analogy, you call upon a man, without rest or food, to continue through the night the work in which he has been engaged all day. While the body may endure the additional and extraordinary exercise of power, it is left in a state of exhaustion, unfitted to respond to any future immediate call upon his health and strength. The simile is almost perfect; the land is called upon to perform a task which it has just finished, and it is thereby left in a state of comparative exhaustion; and although from its great quality of fruitfulness it may be productive and survive this extraordinary draught upon its natural capacity, yet it is left in a condition of frailty which time only cures, and this, perhaps, more than counterbalances the immediate profit of the second wheat crop.

There is another view of this subject which deserves consideration. And here let me borrow another familiar analogy. The physical energies of any animal are unequal to a continual draught upon the same muscular powers of the body. To walk up a flight of stairs, or upon a long continued level plain, bringing into requisition the same muscles, produces a degree of exhaustion which a like amount of diversified work would not effect. Now, while we may not be able to understand all the physical powers of the earth involved in the growth of its productions, nor to define how or what are its operations, all are convinced, from the evidence of actual observation, that these powers become exhausted from too severe use, and fail to respond to our great cupidity.

What and how many kinds of crops shall make up a proper rotation, is a question which involves the mysterious inquiry, how the growth of

one crop affects that succeeding it. Experience has taught that timothy and clover *take* better when sown with rye than with wheat, and nature almost always dictates nicely in the operations of agriculture. It may be that rye affords an essential element in a proper and natural rotation, and it is earnestly suggested that in the order of crops it be restored to the place it held some forty years ago.

The second suggestion which I have to make is, that the various varieties of wheat are supposed to become so mixed as to lose their identity. It is in vain that the earliest and best seed is sought after if its product be negligently commingled in the barn, by accident or design, with other wheat having entirely different, and may be indifferent, qualities. It should be remembered that wheats grow differently, ripen at different periods, and when ground, require different treatment. It is a matter, then, of no little consequence that they should be preserved in their original purity of kind, and true to their names. And in this connection I remark that my observation has led me to the conclusion that wheats do not hybridize or cross-breed by any natural process. This is a daring proposition, and one which conflicts with much written authority. The suggestion is made for the purpose of eliciting a more minute examination of the subject than has hitherto been given to it.

That the unscientific reader may the more readily comprehend the principles of hybridizing and cross-breeding, as they are effected through the generative organs of the vegetable kingdom, I quote from an article by Horace Piper, in the report of the Department of Agriculture for 1867, page 296, wherein the first principles of reproduction are so clearly and intelligently stated. The author says:

> If we examine attentively a perfect flower, we shall find that it consists essentially of two sets of organs, one called the pistils, and the other the stamens. The pistils are located in the center of the flower, and the stamens around them. The summit of the pistil is called the stigma, and on the top of each stamen is situated an anther, a small sack which contains the pollen or fine dust-like substance that fertilizes the ovules or young seeds of the plant. These organs are supposed to perform offices analogous to those of the animal kingdom—the stamens representing the male, and the pistils the female organs. When the anthers, which contain the pollen, arrive at a certain degree of maturity, they suddenly open and emit a multitude of minute grains of pollen, which penetrate through the whole extent of the vascular tissue of the pistil, and ultimately reach the ovules, thus fertilizing them and making them capable, when mature, of reproducing plants of their own kinds.

The author then proceeds interestingly, and in language intelligible to the plainest comprehension, to discuss how admirably nature has provided the *modus operandi* by which the male and female portions of the plant are brought into contact with each other, and produce the fertilization which results in fruit; but while he treats of perfect flowers, where the stamens and pistils are in the same flower, as in the apple; where they are in different flowers, as in the oak; and where they are in different flowers and different plants, as in the hemp—in all of which the pollen is conveyed by artificial aids, such as the wind, birds, bees, or insects—he does not refer to those cases in which nature has so constructed the flower that access of pollen from other flowers is entirely excluded, and hence natural hybridization is practically impossible.

Dr. George Vasey, the botanist of this Department, in commenting upon my views of this subject, says:

> In those leguminous plants with papilionaceous flowers, the anthers are kept in contact with or in proximity to the stigma by the keel petals, which closely embrace them until fertilization is effected. This is designated "close fertilization, in contradistinction from those cases where the organs are freely exposed to the air and liable to intermixture. In some plants of the fumitory family, the anthers and stigma are

confined by a close-fitting sac, formed of the two inner petals of the flower. In other cases the fertilizing organs are contained and kept in contact in long tubes, where access of foreign pollen is apparently excluded. Indeed, in some flowers where the stamens and pistils are exposed to the air, nature apparently furnishes special provision for self-fertilization, as in the Kalmia, where the anthers are contained in little sacs or pouches of the corolla until the pollen is mature, when by an elastic spring of the filament the anthers are liberated and thrown toward the pistil and the pollen diffused upon it. In some plants of the nettle family the filaments are folded spirally until the sepals expand, when they rise with elastic force and scatter the pollen. In these and other cases which might be mentioned, although cross-fertilization is not absolutely excluded, yet the provision seems to be specially designed for self-fertilization.

On this subject we may quote a remark of Professor Henfrey, in his admirable "Elementary Course of Botany:"

Though cross-fertilization is very general, yet there are some cases where every adaptation seems to be made with the view of securing self-fertilization, as in the following case: In Dombeya the sterile stamens are longer than the fertile ones, and are endowed with a power of movement in virtue of which they curve downward and outward, so as to come in contact with the fertile stamens whose anthers open outwardly. In this manner the sterile stamens become dusted with pollen, and then become uncoiled and assume an erect position, so as to come in contact with the stigma, whose curling lobes twist round them and receive the pollen from them.

Other instances are well known to botanists where fertilization takes place in the bud before the expansion of the flower, in which cases self or close fertilization only is possible.

By my direction Dr. Vasey, with the aid of Professor Taylor, of this Department, made a dissection and microscopic examination of two and twenty flowers of wheat in different stages as they approached maturity. Watching the progress of this examination, because I deemed the subject as interesting as it is important, I am strongly impressed with the belief that wheat is a result of close fertilization, and that cross-breeding in this plant never occurs but by artificial means.

The impression is so universal, that by sowing different kinds of wheat together they will cross-breed, and thus partake of the character of each parent, that the hypothesis should be further investigated, and the truth established by conclusive authority.

SYSTEMATIC CROP REPORTS.

There has frequently been expressed, in commercial papers and in industrial addresses, a vague desire for "systematic crop reports," without the slightest indication of what that system shall be, or wherein it should differ from that already inaugurated by this Department. There has been much of "glittering generality," but absolutely nothing of practical suggestion to aid in establishing a better system. There has sometimes appeared a querulous dissatisfaction with present means of information, but never a spark of originality in furnishing superior facilities.

News editors sometimes claim that the newspapers are the best sources of knowledge concerning the crops. What are the sources of newspaper information? A glance at green fields through car-windows, in intervals of deep cuts and subterranean passages; a casual inquiry at railway-stations of a farmer, the extent of whose observation and judgment is unknown; local correspondence, not unfrequently the diseased fancy of a croaker, and sometimes the estimate of true observation and fair

judgment. Occasionally a newspaper, with commendable enterprise, solicits crop statements from the area of a State, or several neighboring States, and obtains irregularly located returns, desultory, fragmentary, combining several crops in one generalization, one having no points of comparison with another, altogether defying interpretation in figures or by any other method of consolidation into one definite expression of quantity or value. More frequently commercial runners of dealers in cereals, wool, meats, or fruits, hired to aid in depressing or raising prices, supply, from all quarters, these news items, tinted with roseate or cerulean hues as best may suit the purpose of their principals. Are these statements reliable? Do they admit of systematic compilation and accurate generalization? Is there not a need of greater accuracy, system, and thoroughness than any newspaper can attain in the haste consequent upon its daily issue?

Some writers upon "systematic crop reports" have suggested the appointment of a person in each congressional district to collect and collate crop news. The cost of such service, with traveling and other expenses, would be at least a round million of dollars, and it would prove entirely impracticable and useless, requiring a whole season to traverse the territory sufficient to make one report, while observation in any one county would cover a stage of growth different from that observed in any other.

If there is a better system than that adopted by this Department it should supersede the present; or, if modification of the official plan would improve it, suggestions founded in sound sense will be promptly considered and tested. As many evidently do not understand this plan a brief description is given.

A statistical correspondent is selected from each county in the States. The nomination is made by officers of agricultural societies, by members of Congress, or by individuals of known character for judgment and integrity. The qualifications requisite are, large facilities for observation of growing crops, sound judgment in agricultural matters, and promptness in responding to circulars of inquiry, both egular and special. The position is honorary rather than remunerative, affording no temptation to mercenary unfitness, offering only co-operation of the Department in local improvements, and such incidental favors, in its documentary and other distributions, as may serve to indicate a just appreciation of the unselfish efforts of public-spirited farmers in the improvement of their respective neighborhoods. These deserving appointees continue faithfully, year after year, a service rendered more efficient by repetitions of its performance, and report, in the first week of each month, with a uniformity and promptness scarcely equaled by salaried agents under compulsory requirement of prompt correspondence. They also respond willingly to systematic inquiry upon special topics for investigation, as wages of farm labor, cost of fences, statistics of bee-keeping, and any specialty demanding a systematic collection of facts, from original sources. These men associate with themselves several assistants, representing different sections of the county, thus constituting a county board of crop statistics. The inquiries are forwarded several weeks in advance, and copies are placed in the hands of these assistants, in season to make the requisite observations, and correspond or confer with the principal, who is then ready to make a deliberate and trustworthy return. The tabulated returns for October, pages 430, 431, in answer to twenty-two separate inquiries, will illustrate the range of the monthly schedules, which vary constantly with the season.

These returns, coming in throughout the first half of each month,

many of the more distant requiring a period of ten days in the transmission by mail, are tabulated as received, the county percentages summed up, and the aggregate divided by the number of counties. Then, as certain counties may produce of a given crop many times the amount grown in certain others, a compound calculation is made, involving the relative production of the counties, by which the first crude average is corrected and the exact value of the entire returns expressed. It will be seen that the amount of labor involved in this work is herculean, fifty to one hundred calculations often being required to correct the average of a single crop in a single State. In addition to the tabulated returns, "remarks" illustrating the peculiarities of the local situation are made by each correspondent, which are examined, condensed, some of the more noticeable arranged for publication, and the remainder, in spirit if not in substance, enter into the statistician's summary of the monthly crop returns. So many are necessarily of a similar tenor that it would confuse and tire the reader to print in detail "extracts from correspondence" of tenfold the usual length.

It is, of course, understood that the returns which are tabulated are in figures. The unit in all comparisons is 100, *i. e.*, 100 is the area of last year, if comparative acreage is sought; 100 is a healthy normal "condition" of growth and vitality, which should insure, with a continuance of circumstances equally favorable, an average crop; and 100 is an average yield, when the amount of production is asked for. The inquiry is also made, after the harvest is fully over, for the actual local yield per acre in bushels of each crop. From all these returns, sifted, digested, compared, and evident or proven mistakes corrected, and inconsistencies harmonized, the average of each crop for each State and for the United States is found; and the result is evidently more trustworthy than any other mode of estimating hitherto undertaken. Germany has a somewhat similar plan, based upon percentage returns, and the English mode is simply a collection of miscellaneous reports couched in the language of the individual reporters, similar to the systematic collections attempted by newspapers in this country.

These crop-reports are made monthly during the growing season. For several years seven such reports, between April and November, have been tabulated and published. Is there a necessity for more frequent reports? The New York Journal of Commerce has the following, which has been copied by two or three agricultural papers:

> At present our only classified crop-reports are those prepared by the Agricultural Department, and sent out monthly. They are not badly done, but, unfortunately, are too late to be of much use; some of the information representing items weeks old, that have already appeared in the papers. At present our best sources of knowledge about the crops are the journals in different parts of the country. If the Agricultural Department would pick up a little more energy, and obtain fresh and early crop-news once a week, instead of monthly, and give it to the press, that would be a decided gain. But if the Signal-Service Bureau could take charge of the work, we would prefer to lodge it there.

If the commercial editors and the public generally will be content with a score or two, or even a hundred, of local reports daily, they can be furnished with ease; if, on the contrary, a comprehensive view of the condition of a crop throughout the country is desired, it is highly probable that *weekly* reports, based upon returns which are two weeks *en route* to this office, cannot be safely promised. The return-circulars are mostly mailed between the 1st and 8th of each month, are tabulated and condensed as they arrive, figured up before all are in, the record is closed by the 15th, and condensed summaries of results telegraphed, as fast as complete, from the 15th to about the 20th of each month; and then

the entire matter is committed to the Congressional Printer, when the responsibility of the Department of Agriculture for promptness ceases. Is greater celerity a reasonable expectation? It may be said that the returns should be telegraphed. But there are no telegraphic stations in a large portion of the counties reported. If there were, $100,000 per month would not pay the cost. With ten times as many telegraphic reporters as are now required for meteorology by the Signal Service Office, each responding to a tenfold longer list of inquiries, a new disparity occurs in the conditions of crop and of weather-reporting. In one case a look at the thermometer, the barometer, and the sky, &c., suffice for a report; in the other, observation throughout the county, examination of all the various crops, conference with assistants, requiring days of preparation, are absolutely necessary. In view of the character and extent of the work to be done, both in the field and in the office, the absurdity of daily or weekly reports of the condition of crops must be apparent to every practical and reasonable man. The *Christain Union*, of September 4, thus gives the monthly report a character for freshness of news far in advance of the literary monthlies:

> Probably every one who looks over the monthly reports from the Department has frequent cause to regret the tardiness of their publication, but printers and publishers will readily appreciate the reasons which make it so difficult to keep such publications up to date. Let the reader take up any of our magazines when they first appear, say about the 20th of the month preceding their date, and he will be surprised at the staleness of the news. Here, for instance, is Harper's, for September. Whatever charges may be brought against that firm we cannot fairly charge them with lack of enterprise, and yet the "Historical Record" for September contains no account of anything that happened after the 24th of July.* If this be the case where subjects of living and universal interest are treated, how much greater must be the delay where the magazine has to be made up from the reports gathered from every township in the Union. The election in North Carolina, on August 1, was of such importance that every nerve was strained to get in the returns promptly, yet it was only last week that an official count, incomplete at that, was published. There is at present nothing to induce agricultural agents to send in their county reports, and the wonder is that the work is done as well as it is. It is believed, however, that a great improvement can be made, and ought to be made, but increased appropriations are necessary.

It may not be known that the total appropriation to the statistical division of this Department, to cover all expenses of collecting, tabulating, and preparing the crop-reports, as well as the cost of all other statistical investigations, and the preparation of matter for the annual and all other reports, is but $15,000 per annum. At the same time the real value of the gratuitous service rendered by correspondents cannot be placed at less than $150,000. The franking privilege also saves a large item of cost, and the blanks and printed reports are an expense of nearly $15,000 per annum. The crop-return system, exclusive of the other operations of the division, does not cost the Department exceeding $7,500, or the Congressional Printing-Office more than an equal amount.

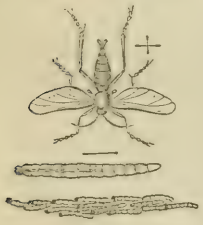
With this small expenditure, in the first years of immaturity and incompleteness, a fair analysis of results will show this system to be superior to any hitherto attempted in this country, and to possess capabilities of far greater usefulness if Congress, the press, and the people manifest a liberal and intelligent appreciation of its actual value.

*The September report of the Department of Agriculture gave the crop report of Oregon, Texas, Florida, and of every other State in the Union, for *September*, made up and mailed from the 1st to the 10th, a synopsis of which was published September 18th, and the entire number of 84 pages issued in September.

ENTOMOLOGICAL RECORD.

By Townend Glover, Entomologist.

"Army" or "snake worm."—A letter was received in the latter part of July from a correspondent, Mr. C. Moralle, of Leesburgh, Virginia, containing a number of very small white worms, or larvæ, having distinct black heads. These worms appeared to be clinging to each other by means of a viscid substance on the surface of their bodies, and formed a small living mass. In the accompanying letter Mr. Moralle stated that what attracted his attention was "the peculiarity about them that they gathered in a long string, resembling a snake, piling themselves up thickly in the middle and tapering at each end, and when they moved the whole mass moved as in one body." Unfortunately these worms were all dead when they arrived, but Mr. Saunders, of this Department, brought a mass of similar larvæ a few days afterward, which had been given him by a gentleman also in Virginia. These specimens were placed in a glass jar, having a small quantity of damp soil at the bottom, and retained their ball-shaped form for some time, and then commenced to creep round the side of the jar on the earth in a string, three or four abreast, and continued traveling for a couple of hours; they then dispersed and buried themselves a short distance under the surface of the earth, and changed into pupæ, appearing six or eight days afterward as perfect flies. These were about one-tenth of an inch in length, (expanse 0.13,) of a dusky black color, with dark brown legs and dusky wings. Upon examination they proved to be a species of *Sciara*, the larvæ or worms of which usually feed upon decaying vegetable substances, and are frequently found in fungi. The species above mentioned as occurring in Virginia is very similar in habits to a European species, *Sciara thomæ*, which is usually called the snake or army worm in Germany, from its habit of sometimes assembling in innumerable numbers, creeping among and over each other, and hanging together by means of a viscid moisture, and forming a mass like a snake or rope, sometimes several feet in length, and two or three inches in breadth. The fly of the European species, *Sciara thomæ*, is described as having yellow stripes or points on the abdomen, whereas our American species (at least when dried) does not show any vestige of yellow whatsoever on the abdomen, but is of a uniform dark brown color, although the worm or larva has the same habits of forming snake-like processions. It is somewhat singular that these worms appeared almost simultaneously in two places in Virginia, while no mention is made of their appearing elsewhere.



These insects (*Sciara*) generally do no damage to cultivated vegetation, although one species, *Sciara* (*Molobrus*) *mali*, is mentioned by Dr. Fitch as being found in the interior of apples, especially when pierced or eaten out by the codling moth, (*Carpocapsa pomonella*,) or other insects, where they merely accelerate the decay of fruit already previously injured. In Europe the larvæ of other species, *Sciara fucata*, and *quinque maculata*, live in putrid or decaying turnips, &c., and have been accused of producing the disease in potatoes commonly known as the "scab." *Sciara pyri* is said to deposit its eggs in the yet unfolded pear-blossoms, the larvæ of which, when hatched, work themselves down to the core, causing the young and yet undeveloped fruit to wither and fall to the ground.

The species found in Virginia probably does no injury to cultivated

plants, but feeds on putrid vegetable substances, under bark of trees' moss, or stones, and in decaying fungi, as a very similar larva not yet developed into the perfect fly has lately been taken near Washington, feeding by hundreds on the under side of a species of fungus or agaricus, (allied to *Amanita muscaria*,) which was completely riddled and destroyed by them. If this is the case in one instance, may it not be probable that these larvæ, when in such multitudes as to entirely destroy the fungi upon which the eggs were deposited and the young larvæ had previously existed, may find it necessary to emigrate in swarms in search of fresh fungi to feed upon?

INSECT INJURIES.—*Lachnosterna.*—In New London County, Connecticut, the grass, in many meadows, was eaten up at the roots by a worm which, most probably, was the *Lachnosterna fusca.* The white grub-worm—a name which popularly designates several species of the *Lachnosterna*—was more or less injurious to corn in Cass County, Michigan; in Noble and Laporte Counties, Indiana; and in Muscatine and Mahaska Counties, Iowa.

Potato insects.—The Colorado potato beetle (*Doryphora decem lineata*) is reported by its specific name only in Ohio, where it was destructive to the crops of Franklin, Hamilton, and Noble Counties. The potato crop was molested by insects, not specifically designated, in Washington County, Pennsylvania; in Cass and Shiawassee Counties, Michigan; in Ramsay County, Minnesota; in Reynolds and Ozark Counties, Missouri; and in Curry County, Oregon.

Cut-worms.—Some species of the *Agrotis*, commonly called cut-worms, were injurious to corn in Howard County, Maryland, and in Cass County, Michigan.

Chinch-bugs, (*Micropus* (*Rhyparochromus*) *leucopterus.*)—This insect was especially destructive to sorghum in Adams County, Ohio; in Jennings and Brown Counties, Indiana; in Jasper and Phelps Counties, Missouri; and in Linn County, Kansas. The newly-sown wheat crop has felt their ravages in Brown and Jennings Counties, Indiana; in Macon, Boone, Polk, Crawford, Jasper, and Reynolds Counties, and in Linn County, Kansas. Franklin County, Illinois, was overrun with them to the great damage of the corn crop, as also in Jennings and Boone Counties, Indiana; in Macon, Boone, Crawford, Polk, Jasper, Reynolds, Phelps, Miller, and Iron Counties, Missouri, and in Linn County, Kansas. In Crawford County, Missouri, three distinct broods are noted. The first appeared about the 1st of May, and inflicted such damage upon the wheat crop that several fields were plowed up. The second brood came about the last of June, and the third about the last of August. At the last visitation the corn was in milk, and upon it they fell with great voracity, very seriously reducing its yield both of grain and of fodder.

Army-worm, (*Leucania unipuncta.*)—The army-worm greatly damaged oats in Carroll and Ogle Counties, Illinois. In Cherokee and Labette Counties, Kansas, they did great mischief in newly-sown wheat, especially on stubble ground.

Hessian fly, (*Cecidomyia destructor.*)—During the spring the fly infested the wheat in Ralls County, Missouri, and in Labette County, Kansas. In the latter-named county it was observed especially in early sown crops.

Grasshoppers.—A grasshopper (probably *Caloptenus femur rubrum*) in Lincoln County, Kentucky, cut the buckwheat down close to the

ground. In Thayer County, Nebraska, corn was seriously damaged by another species, *Caloptenus spretus*,

Pea-bugs.—The pea-bug (*Bruchus pisi*) troubled farmers in some parts of Davis County, Utah, causing them to discontinue the planting of that crop.

Cotton insects.—The cotton caterpillar, or army-worm of the South, (*Anomis xylina*,) and the boll-worm, (*Heliothis armigera*,) completed their summer's work by a very effective demonstration during September. North Carolina, judging from our previous reports, had enjoyed almost entire immunity from this scourge during the summer, but during September it was felt seriously in several parts of the State. Reports of insect depredations have been received from Tyrrel, Wake, Craven, Edgecombe, and Sampson Counties. In Dooly County, Georgia, the caterpillars appeared early in the month, and entirely swept the top crop. They reduced the yield one-half in Calhoun County, and were very mischievous in Muscogee, Lee, Sumter, Worth, Columbia, Heard, Marion, Schley, Wilkinson, Chattahoochee, Upson, Liberty, Whitfield, Clay, and Decatur Counties. In several cases their depredations exceeded anything of the kind previously known, involving the destruction of leaves and bolls entire. In other cases their injuries resulted in the reduction of the yield by a very formidable percentage. Caterpillars and boll-worms, also, figure prominently in the Florida County reports. Serious depredations were committed in Liberty, Jackson, Suwannee, Orange, Gadsden, Jefferson, Alachua, Clay, Columbia, and Levy Counties. In Alabama, the same blighting influence was felt in St. Clair, Hale, Butler, Clarke, Lee, Montgomery, Colbert, Blount, Calhoun, Macon, Chambers, Pike, Autauga, Perry, and Limestone Counties. In some cases, as in Pike County, the brunt of the disaster fell upon the lowland cotton. The mischief appears to have been even still more serious in several counties of Mississippi. In Jasper everything about the cotton plant that a worm could eat was stripped. Complaints are very earnest of these depredations in Rankin, Warren, Grenada, Amite, Wayne, Yalabusha, Lauderdale, Washington, Wilkinson, Winston, Jefferson, Hinds, and Kemper Counties. In several of these counties very little cotton matured after August 1. Louisiana sends reports of insect damages to cotton in Union, Morehouse, Tangipahoa, East Feliciana, Concordia, Claiborne, and Washington Counties. Very great damage was also done in DeWitt and Austin Counties, Texas. In the last-named county whole fields were swept.

CHEMICAL MEMORANDA.

By Ryland T. Brown, Chemist.

Laboratory work.—J. E. Johnson, of Saint George, Utah, forwarded to the laboratory a specimen of Indian food, much used by the tribes inhabiting the great central basin of the continent. The specimen which reached the laboratory had the appearance of a bulbous root which had been subjected to the action of heat till it was quite soft. Mr. Johnson describes the plant as belonging to the genus Yucca, and as growing abundantly in dry rocky soils. We regret that we are not able to obtain the root in its fresh state, for in its roasted condition, both the starch and true sugar would probably appear as glucose, or fruit sugar, in the analysis. After subjecting the sample to a temperature of

100° C. for forty-eight hours, it gave the following results on proximate analysis:

Glucose, (fruit sugar)	7.3828
Albuminoid matter	0.2168
Woody fiber and cellular tissue	92.4004
	100.0000

The composition of the root will probably vary with the season of the year, and perhaps with the soil in which it grows.

Three samples of sumac leaves were sent to the Department, in which it was required to determine the amount of tannin. No. 1 is sumac (so called) grown upon elevated, dry lands, near Campo, San Diego, California, and No. 2 grew upon low, moist land in the same locality. These samples were sent by A. M. Gass. A third sample (No. 3) was sent by Mr. Clarke Irvine, from Oregon, Holt County, Missouri.

The analyses resulted as follows:

No. 1.

Tannic acid	13.1
Woody fiber, cellular tissue	86.9
	100.0

No. 2.

Tannic acid	7.92
Woody fiber, &c.	92.08
	100.00

No. 3.

Tannic acid	23.075
Woody fiber, &c.	76.925
	100.000

Samples No. 1 and No. 2 were collected at different times in the season, with a view to determine the best time in the season to collect them, or, in other words, to determine at what point in the development of the leaves they contain the largest amount of tannic acid. We were unable to make any determination of this kind, however, since, as we have intimated above, we had some doubts as to whether they were leaves of the same species of plants, and indeed whether they were true sumac. We therefore consulted the botanist of the Department, who reported upon them as follows:

The specimens of leaves marked No. 1 are undoubtedly those of *Styphonia integrifolia*, Nutt. A small tree growing near the sea-coast in Southern California, and forming dense thickets. It belongs to the same natural order (*Aniacardiaceæ*) as the sumacs, but differs from them in several particulars. It does not have the pinnate leaves which characterize most of the sumacs, but its leaves are simple, thick, and leathery, one to two inches long. The bark is said to exude an astringent resinous gum.

The leaves marked No. 2 are too much broken up for identification, but are evidently not of the same species as No. 1.

The sample from Missouri is *Rhus glabra*, or true sumac, and contains a fair percentage of tannic acid.

SCIENTIFIC NOTES.—*Sulphur.*—The use of sulphur to destroy parasitic growths, both animal and vegetable, is of high antiquity and of almost universal adoption; but just how sulphur operates in producing the marked results which commonly follow its use is a question which

has been but little discussed. At a late meeting of the Royal Horticultural Society at Birmingham, England, a paper was read by Charles Roberts, F. R. C. S., introducing the discussion of sulphur and its mode of action on the lower forms of life, in a manner which promises to throw much light on an occult subject. Mr. Roberts' chief argument is directed to the proof of the proposition that the effects are not produced by sulphur, as such, but by its lowest combination with oxygen—sulphurous acid, or, as he names its gaseous form, *sulphozone*. Pure sulphur is insoluble in water, and therefore cannot act chemically on organisms, whether animal or vegetable; and there is nothing in its physical form that would enable it to act mechanically in a manner injurious to life. This conclusion was reached from careful and often-repeated series of experiments by which it was demonstrated that sulphur, thoroughly purified from all traces of sulphurous acid by repeated washings, is utterly ineffectual in destroying mildew or other organisms, and that seeds germinate as readily in such sulphur as in sand. Pure washed sulphur, mixed with a little flour and moistened with water, covers its surface with mold in a few days, if kept at a favorable temperature; and cheese mites live and multiply indefinitely in cheese covered with pure sulphur. These results were all reversed when the common flowers of sulphur were used. This always contains an appreciable amount of sulphurous acid. Prosecuting this line of experiment, it appears that the efficiency of sulphur, in any form in which it is used to destroy or prevent fungoid or parasitic growths, depends entirely on the quantity of sulphurous acid present. Charcoal, and many other substances capable of absorbing and retaining gaseous sulphurous acid, is, when thus impregnated, as effectual as sulphur in destroying mildew and kindred organisms.

In the light of these facts, Mr. Roberts adds: "From my experiments and observations, and from the well-known properties of sulphurous acid, I conclude, therefore, that it is the acid, accidentally present in the sulphur, which is the active agent in the destruction of mildews and blights, and that the sulphur is only the medium for its application." The acid may be dissolved in water, as well as absorbed by porous bodies other than sulphur, and thus furnish a very convenient form for its use in the destruction of parasitic growths. For horticultural purposes, however, a precaution will be necessary in using solutions of sulphurous acid, to limit the strength of the solution, lest in destroying parasites the remedy may prove destructive to the plants also. As some plants will endure a much more concentrated solution than others, the proper strength adapted to any given case must be left to the judgment of the gardener.

In addition to its power over vital forms and forces, sulphurous acid exerts a notable chemical action on dead animal and vegetable matter, suspending, to some extent, the usual process of decay and dissolution, and destroying or modifying emanations from persons suffering under infectious diseases. It is, therefore, a most potent and valuable disinfectant. How sulphurous acid operates to produce its effects both on the life and form of organisms is a question that opens a field to the physiological chemist which has been but little explored.

Welding copper.—The Journal of the Franklin Institute says that Mr. Rust has succeeded in perfecting a method by which he accomplishes a most perfect welding of copper. He mixes together 358 parts of phosphate of soda and 124 parts of boracic acid. This powder is applied when the metal is at a low red heat; it is then brought to a cherry-red and at once hammered. A wooden hammer is recommended.

Zinc labels.—In nurseries and horticultural establishments generally it is necessary to attach labels to the different specimens, and when these are exposed to the weather the writing on the label becomes illegible in a few years, and if care is not taken to renew it, the inscription will be lost. These labels are commonly made of wood, and the inscription put on with a plumbago pencil. Sheet-zinc cut into any convenient form and attached either by a slender point cut to the label, or by a fine copper wire, is the best material for labels. A special ink for the inscription may be made by taking one part each of acetate of copper and chloride of ammonium, and half a part of lampblack, and mix these with ten parts of water. Keep it in a glass bottle with a ground-glass stopper. Shake well before using, and write with a coarse steel pen. The writing will resist the action of the weather for years.

Artificial marble.—The manufacture of artificial stone is daily becoming more important, as the demand for the article increases, and new processes are being introduced constantly, looking both to the durability and beauty of the products. The latest of these is the manufacture of artificial marble by Signor Raccotti, in London, England. It is said to be very beautiful, and to cost but one-tenth the price of natural marble.

Artificial butter.—A commission, created by the victualing department of the navy of France, reports a process for the artificial production of butter, of which it is affirmed that it will not become rancid by age. The following is the process of manufacture recommended:

Best fresh beef-suet is first mechanically cut by means of circular saws fitted to a cylinder, and is next placed in a vessel containing water, carbonate of potassa, and fresh sheeps' stomachs previously cut up into small fragments. The temperature of this mixture having been raised to 45° C., (112° F.,) the joint influence of the pepsine from the stomachs, and heat causes the fat to be separated from the cellular tissue; the fatty matter floating on the top is decanted, and, after cooling, submitted to very powerful hydraulic pressure; the stearine is used in candle-making and the semi-fluid oleomargarine is used for making the artificial butter in the following manner: 50 kilograms of the fat are poured, along with 25 liters of milk and 20 liters of water, into a churn, while there is added 100 grams of the soluble matter obtained by soaking some hours in milk from cows' udders and milk glands; a small quantity of annatto is also added, and the process of churning is proceeded with. The butter thus obtained is well washed with cold water.

Potassium—by a new method.—To procure the alkaline metals, potassium and sodium, readily and cheaply, is a desideratum, not so much on their own account as on account of the relation which these metals sustain to the manufacture of aluminium. Professor A. E. Dolbear produces potassium by heating the sulphide of that metal, in an alembic, to a bright red heat, in contact with iron filings, when the metal distills over and is received in common coal-oil. The chemical reaction is a very interesting one, though very simple. The sulphide of potassium at a high temperature yields its sulphur to the iron filings, and the potassium, thus abandoned, passes over as a vapor, and is condensed and received under naphtha, or any other hydrocarbon fluid. Whether this process will cheapen the alkaline metals, remains yet to be tested. It is not probable that we will ever be able to obtain aluminium by a direct process from its oxide, and as long as metallic sodium, or potassium, is indispensable in the production of aluminium, that important metal will correspond in price to the alkaline metals, by the agency of which alone it can be obtained.

Phosphoric acid.—The occurrence of phosphorus in combination with the ores of iron, whether as phosphides or phosphates of that metal, has long been an annoyance to iron manufacturers, and many rich ores are rendered worthless by the presence of phosphorus, rendering the iron

brittle and worthless. Julius Jacobi (in *Bayerischers Industrié und Gewerbeblatt)* proposes a method of freeing iron ores from phosphorus, and at the same time saving the phosphoric products and economizing them for agricultural purposes. His process consists in roasting the ore and crushing it, and, after placing it in a proper receiver, submitting it to the action of water charged with sulphurous acid under pressure. The ore is then washed with water to remove all the soluble products, and the phosphoric acid precipitated from the water with fresh burnt lime, and the phosphoric acid obtained as a neutral phosphate of lime. If the process is effectual, and not too expensive, the proposed method is very important, as rendering many ores available which are now regarded as worthless, and at the same time supplying a demand in agriculture which has heretofore been but imperfectly met. If the sulphurous acid can be furnished from the ores themselves, in the process of roasting, it will go far in reducing the expense.

The Osage orange.—The *Maclura aurantica* has become a familiar shrub in most parts of the United States, from its general use as a hedge-plant; but it is now proposed to utilize the Osage orange for other purposes. A decoction of the wood is said to yield a beautiful and very permanent yellow dye, and this decoction, carefully evaporated, forms a bright yellow extract called aurantine, which may be used in imparting its color to fabrics. In addition to this coloring-matter, the wood of the Osage orange is rich in tannin. Experiments made in Texas represent that hides are tanned quicker with the wood of this tree than with oak bark. The seeds yield a bland, limpid oil, resembling olive-oil, and which may, in general use, be substituted for it.

Effect of atmospheric pressure.—Mr. Paul Best, (Les Mondes, July 11.) in a very interesting memoir, shows that the destruction of life by diminished barometric pressure is chiefly to be attributed to deficiency of oxygen. An animal that will die with the pressure reduced to 18 centimeters (7 inches) of mercury, will endure a reduction to 6 centimeters (2.4 inches) if an additional supply of oxygen be furnished. And the converse is also true, that the danger of too great pressure is from the increased amount of oxygen in a given volume of air inhaled.

Topographical measurements in the West.—Professor C. Thomas, assistant of Dr. Hayden, United States geologist, has compiled and published a series of tables giving important data with regard to the Rocky Mountain regions and the great plateau of the West. The southern portion of the great American plain, the *Llano Estacado*, has an average elevation of about 4,000 feet above the sea. The ascent from Preston to the margin of the Staked Plains is about 10 feet to the mile, and from Fort Smith to the northern margin of the plains the ascent is 6 feet to the mile. From Kansas City to Denver Junction the ascending grade is a little more than 8 feet to the mile. From Omaha to Cheyenne the grade ascends just 10 feet per mile. The ascent from Fort Union at the mouth of the Yellowstone to Fort Benton is only about 2½ feet per mile, while from that point west to the base of the mountains, the average ascent reaches 20 feet to the mile. The plateau which lies between the Black Hills and the Wahsatch range of mountains has an elevation of about 6,500 feet above the sea, 1,200 feet above the western border of the plains, and 2,200 feet above the Salt Lake basin.

The Rio Grande, from Isleta to El Paso, has a fall of about 5 feet to the mile, but from Isleta south for some distance its descent is 6 feet per mile. The Canadian, from the mouth of Pajarito Creek, for two hundred

miles eastward, descends at the rate of 9 feet per mile. The Arkansas, from the mouth of the Apishpa to Fort Atkinson, has a fall of between 8 and 9 feet to the mile. The descent of the North Platte, from Fort Fetterman to its junction with the South Platte, is 7 feet, and the South Platte, from Denver to the junction, is between 9 and 10 feet per mile. The fall of Snake River from the mouth of Ross's Fork, north, is about 6 feet to the mile. These figures show the practicability of distributing the water of these streams over the plains for the purpose of irrigation.

Of mountains, we have six in these tables whose summits rise above 14,000 feet. These are: Mount Harvard, 14,270; Pike's Peak, 14,216; Gray's Peak, 14,145; Mount Lincoln, 14,123; Mount Yale, 14,078; Long's Peak, 14,056. These measurements furnish data for conclusions, both curious and important, connected with the study of climatology and the adaptation of the "Great American Desert" to agriculture, stock-raising, &c.

Preserving action of boracic acid.—It has been found that boracic acid has a preservative action upon milk and beer, and it is stated that one gram added to a quart of milk keeps it sweet and fresh in hot summer weather for one hundred and twenty hours, while milk not treated in this way will become sour in thirty-six hours. The addition of boracic acid to milk does not injure it for use, but the cream is separated far more slowly.

Spontaneous combustion of wood.—A certain French writer gives an account of the spontaneous combustion of a wooden beam in a building at Ribemont, (Aisne.) The beam was exposed to the direct rays of the sun, and during one of the hot days of summer it was found to be on fire. the combustion proceeded slowly but was quite distinct, and emitted a smoke which had a curious appearance, and on blowing on the wood it burst into a flame. It is asserted that the fire was due to the heat of the sun alone.

Chemical constitution of tannic acid.—The doubtful character of the chemical constitution of tannic acid has led to some very interesting investigations. Doctor Schiff has lately come to the conclusion that it is an alcoholic anhydride of gallic acid, or di-gallic acid. In other words, he considers that it is an ether which bears the same relation to gallic acid as ordinary ether does to alcohol. Since, therefore, gallic acid differs from tannic acid merely in the elements of water, the discovery of some method by which these elements could be displaced might lead to some practical results with regard to the processes of tanning.

The value of girondin as a disinfectant.—The prevalence of disease in many of our large cities, due in a great measure to the filthy condition of the streets, shows the necessity of having some effectual disinfectant. To this end the board of health in New York City has made a series of experiments upon the value of all the disinfectants in the market, and decided that girondin, a French invention, is the most effectual. It is due to the use of this article, as is claimed, that the city has been kept free from epidemic during the past two years.

Test for silk goods.—If a sample of silk goods suspected to contain other kinds of fiber be treated with hydrochloric acid of 1.13 specific gravity the silk will be dissolved, while other kinds of fiber, such as jute and linen, will remain undissolved.

Preservation of wood.—F. Sieburger states that the inconveniences of the application of chloride of zinc and so-called water-glass solution, for

the preservation of wood, may be avoided by first washing the wood with a hot and saturated solution of three parts alum and one part sulphate of iron, and afterward with a more dilute solution of sulphate of iron, to which a sufficient quantity of fire-clay has been added to make it as thick as ordinary paint. Another method is as follows: The wood is repeatedly painted over with a hot solution of glue, until a very thin coat of glue remains upon the surface, the wood is then painted over with a thicker solution of glue and a mixture of one part of sulphur, one part of ochre or pipe-clay, and six parts sulphate of iron is applied with a dredger, the ingredients having been first pulverized and thoroughly mixed.

Sensitive streams.—Professor Edwin J. Houston, while spending a summer's vacation in Pike County, Pennsylvania, had the good fortune to discover the sensitiveness of water to sound waves. Among the many beautiful waterfalls of that section he found one scantily supplied with water which dripped in small streams from the ends of the moss covering the rocks of the precipice; the air being still and the stream free from ventral segments. And it was found that on sounding a shrill falsetto note the streams would instantly respond, and change the grouping of the drops and the position of the ventral segments. A heavy rain, however, flooded the stream and prevented further investigation.

Dyeing veneer wood.—C. Méne recommends that the wood be steeped for twenty-four hours in a solution of caustic soda and boiled with it for one-half hour. After washing to remove all the lye it will be found to have become as soft as leather, and equally as plastic, and to be in an excellent condition to absorb the dye stuffs. The dyes are fast and thoroughly penetrate the wood, which after drying may be sawed and veneered.

BOTANICAL NOTES.

By Geo. Vasey, Botanist.

Curious phenomenon in vegetable physiology.—It has long been known to botanists that, occasionally, after the felling of pine and fir trees, their stumps would continue to increase in diameter, *i. e.*, form new woody layers for several years. Dutrochet mentions some cases of extraordinary longevity in the stock of *pinus picea* after the trunk had been felled. He says that in the year 1836 a stock of *pinus picea* felled in 1821 was still alive, and had formed fourteen thin new layers of wood, that is one each year; and another, felled in 1743, was still in full vegetation, having formed ninety-two thin layers of wood, or one each year. This singular phenomenon was long a puzzle to botanists and vegetable physiologists. Over thirty years ago Goeppert, an accomplished botanist of Breslau, undertook an investigation of the subject. The result is published at large in the Annales des Sciences Naturelles for 1843. It appears that in all the cases examined by Goeppert there was a union of the roots of the fallen trees with the roots of living trees growing in the immediate vicinity, and his explanation of the phenomenon was that the stumps maintained their growth by drawing their supplies of sap from the trees with which they were thus con-

nected. The union of roots in these cases was sometimes woody and sometimes only by the bark of the roots. So far as observed this anastomosis or natural grafting is confined to coniferous trees, and to only a few species of them, chiefly the silver fir, the spruce, and occasionally the Scotch fir. In the London Gardeners' Chronicle of August 31 is an account of an instance of this kind of anastomosis of the roots of a larch, and a figure is given of the specimen, in which the stump and its root connections are exhibited. The cut stump shows rotten wood in the center, with the new wood at the circumference surging over the edges of the wound.

Although the discovery of this root union explains some of the questions involved in this curious phenomenon, it does not explain them all; for instance, why does not the sap, which is thus robbed from the roots of the nurse tree, pass up in the usual channels and overflow at the top of the stump, as is the case when a grape-vine or deciduous tree is cut during the active ascent of the sap? As the growth of new wood in exogenous trees takes place from the cambium, and the cambium is supposed to be the sap which has been elaborated in the leaves, what is the source of the cambium in these stumps?

It would seem as if there was here a complete contradiction of the ingenious theory of some of the French botanists, that wood growth begins in the leaves or leaf-buds and descends continuously from thence to the roots, so that in fact wood may be considered the united mass of roots which emanate from the leaves of the plant.

The theory of De Candolle is that the woody and cortical layers originate *laterally* in the cambium furnished by pre-existing layers and nourished by the descending sap. To use the words of De Candolle, "The whole question may be reduced to this: either there descend from the top of a tree the rudiments of fibers which are nourished and developed by the juices springing *laterally* from the body of the wood and bark, or new layers are developed by pre-existing layers which are nourished by the descending juices formed in the leaves." The latter part of this statement, though somewhat vague and unsatisfactory, probably involves the true theory of the formation of wood. The *pre-existing layers* mentioned in De Candolle's statement include the medullary rays which reach the circumference. These medullary rays are composed of cellular tissue derived from the pith, and, like it, are capable of indefinite extension by cell multiplication.

The primary state of all the tissues of the plant is the condition of simple cells, each of which is in a certain sense an independent body, having its own life-work and history in the complicated mass of which the tree is composed. All extension of the tree in any direction is made through the medium of cell-growth and cell-modifications, and wherever there is cellular tissue in a state of vitality there may be cell-multiplication whenever material for growth, *i. e.*, sap in different stages, is brought into contact with such tissue.

In the case of the pine stumps alluded to, the medullary rays of the recent wood retain their vitality, and when the sap rises it is transmitted through these rays and through the interspaces of the woody matter to the surface beneath the bark, these being appropriated to the organization of new cells whose walls are thickened by continuous secondary deposits, as in the normal formation of woody tissue. Of course the amount of this woody formation will be limited, from the deficient supply of sap and the want of concentration which it would obtain by passing through the leaves.

RURAL ADORNMENT.—Nothing contributes more to the appreciation of a rural home than its surroundings. Nothing is more seriously missed by the early settlers in a new country, especially by the female members of a household, than the shrubs and flowers which they have left behind them in their early homes. How many a heart has longed for the familiar lilac-bush with its early, handsome, and fragrant clusters of flowers. What sweet memories of the ever-pleasing and beautiful rose-bush; or, of the old-fashioned snow-ball, with its masses of snowy flowers contrasting so finely with its dark green foliage; or the modest, unobtrusive little wax-bush with its pearly blossoms, and in due time its strings of snow-white berries which refuse to drop from the slender twigs long after the frost has stripped the green leaves.

Notwithstanding the absence of these and many other memory-honored shrubs and flowers in the frontier homes, very much may be done to substitute for them native plants of perhaps equal value. There is a patch of wood not many miles distant from any settler where some shrubs may be procured which will relieve the garden or yard of its nakedness, and lend beauty and attraction, perhaps quite equal to those favorites which are now beyond reach. The kind of such shrubs will, of course, vary in different localities.

South of latitude 40° few western woods are destitute of the flowering dogwood, *Cornus florida*, and the red-bud, *Cercis canadensis*, two shrubs which flower in company in early spring, and present the greatest contrast of color, the one a pure white, and the other a perfect blaze of scarlet; one to be succeeded by bright red berries, which last until winter, the other by clusters of long pods which hang gracefully beneath the leaves, and still persist when autumn has bared the branches of their handsome heart-shaped leaves. In localities where these cannot be procured their places may be supplied with several of the smaller kinds of dogwood which abound in every forest, or with some of the *viburnums* which are equally common, and form attractive shrubs, some of them with rather showy berries.

The wahoo, *Euonymus atropurpureus*, with its small dark purple flowers, is very showy in autumn when loaded with its curious crimson pods. Smaller ornamental shrubs may be found in most localities. Among these we may mention the shrubby johnswort, *Hypericum prolificum*, which furnishes an abundance of rich yellow panicles, or in northern localities its place may be supplied by the equally handsome shrubby cinquefoil, *Potentilla fruticosa*.

Nor need our lady friends be wholly without roses. South of latitude 40°, in rich bottom lands, the climbing rose, *Rosa setigera*, parent of several beautiful cultivated varieties, is abundant, and will show its appreciation of the kind hand which shall transplant it to the warm side of a cottage, by sending up amazingly vigorous shoots, which, in a few years, will perfectly embower and beautify the home.

Farther north the swamp-rose, *Rosa Carolina*, or even the early wild rose of the prairies and hills, *Rosa blanda*, will well repay cultivation.

The variety of shrubs may be further increased by the wild hydrangea, which is sometimes nearly equal to its exotic relative, and is much more hardy; also, by several species of spirea, particularly *Spirea opulifolia* and *Spirea salicifolia*, which is extremely common in rich lowlands everywhere.

The wax-bush, or snowberry, *Symphoricarpus racemosus*, is native in some portions of Wisconsin and Minnesota, where it is also accompanied by an allied species, the wolf-berry, *S. occidentalis*, which has larger flowers and very similar white berries; while more southward, in Illi-

nois, Iowa, Missouri, and Kansas, may be found another species of the genus *S. vulgaris*, called Indian currant, or coral berry; and whoever transplants a bush of this kind into the garden will find it to become a favorite.

Of climbing vines for covering porches or arbors, our most valuable kinds may be found in almost every thicket in the country; particularly, we may mention the Virginia creeper, or American ivy, *Ampelopsis quinquefolia*, which may be distinguished from the poison ivy, *Rhus toxicodendron*, by having its leaflets in fives, while the latter has them in threes. South of the fortieth parallel the beautiful trumpet creeper, *Tecoma radicans*, is abundant in rich bottoms, and, with a very little care in transplanting, will soon make a splendid display of its large and showy trumpet-shaped flowers. Farther north the less pretentious and modest virgin's bower, *Clematis virginiana*, with its conspicuous silky tufts of fruit, will furnish a handsome ornament for bower or porch.

American plants in Great Britain.—An English journal says: "The beautiful *Asclepias tuberosa* is, this season, producing freely its showy, bright orange-colored flowers in several collections round London. This fine perennial thrives perfectly well almost anywhere, if planted in sandy peat." In the same journal we find the following: "One of the best hardy aquatic plants in flower at the present time is the North American pickerel weed, *Pontederia cordata*, a plant by no means so often met with as it deserves to be. It produces a stout spike of handsome sky-blue flowers from 1½ to 2 feet high. No ornamental water should be without this charming aquatic, which should, however, have a place near its margin."

Again: "The American pitcher plant, *Sarracenia purpurea*, is thriving as well as any native plant in the bog-garden in Messrs. Backhouse's nurseries at York, and by its side a healthy little specimen of the still more curious *Darlingtonia Californica* is beginning to grow freely."

The above extracts will show that many of our native plants find a better appreciation in foreign cultivation than they do in their own country. It is to be hoped that our gardeners and florists will give more attention to the introduction of native plants whose merits have been overlooked because of their commonness.

MICROSCOPIC INVESTIGATIONS.

By Thomas Taylor, Microscopist.

Onion blight and smut.—About the middle of August last, I was invited by Mr. Benjamin P. Ware, of Swampscott, Massachusetts, to inspect a field near his farm, consisting of four acres of onions, which were badly blighted with fungi. The ground had been cultivated in the usual manner, and prime seed was used. At an early stage of their growth it was discovered that the onion fungus had diffused itself so generally over the field that it was deemed useless to cultivate it further. In the plot we found remnants of the crop, but very few onions had escaped the blight. The crop was practically consumed, causing a loss to the proprietor of about $2,000. I selected a few specimens of the blighted onions for experiment. The blight is first observed at the base of the leaves as a white mold, which ultimately spreads over the bulb, gradually blackening the surface, and penetrating through the

layers. When a portion of the white mold found on the leaf is transferred to a microscopic slide, and viewed by a power of about one-eighth, it appears as at 1, Fig. 18. The spores seen on the ends of the branches are compound, and when moistened, resolve themselves instantly into separate sections (2.) When the mold is matured, viewed by a power of about 75 diameters, it appears double-fruited, as at 5 and 6. It is believed by the farmers at Swampscott, that dry weather favors the growth of the white mold, but that moist and rainy weather favors the growth of the black fungus, or rot, which is seen mostly on the bulb of the onion. When the black spores are viewed by a power of about one-eighth, they appear of a rosette form, (3,) each resembling a combination of cells, encircling a common center. Figure 19 represents at 7 a highly magnified view of a portion of the leaf of a mildewed onion; 8, a chain of elliptical spores, which grow in great profusion over it, when the leaf is kept in a moist condition for a few days; 9 shows stomates of the leaf from which thread-like mold, mycelium, is seen to proceed, proving that the fungus has ramifications under the epidermis, and doubtless through the intercellular spaces, if not through the cellular substance itself, from which the fungoid threads draw nourishment for the support of their fruit, &c. I subjected the black spores (3) to the action of concentrated nitric, nitro-muriatic, and sulphuric acids, caustic, potash, and lime, for twenty-four hours, without effecting any change in structure. When immersed eight days in nitro-muriatic acid, the spores become slightly bleached, and appear as at 4. When immersed in heavy oil of tar, which contains a large portion of carbolic acid, their structure is materially changed.

Fig. 18.

In an address delivered by Mr. Ware before the Essex Agricultural Society, at Newburyport, September 29, 1869, he said that "The onion blight and smut is at times very destructive to the onion crop, turning the most promising fields in a few days to scenes of desolation, which is caused, in my opinion, by a parasitic plant, growing upon and consuming the vitality of the onion. The onion smut so impregnates the land with its spores, as to render it unsafe to plant onions for several years on land thus affected. White blight comes upon the crop at the period of its most vigorous growth, in a dry time, showing its effect perhaps in a small spot at first, but, in case the dry atmosphere continues, rapidly spreading over the whole field. Two or three days give sufficient time to stop entirely all future growth of the crop, unless a change in the weather occurs unfavorable to the growth of the parasite."

When an onion affected with fungus is placed in a vessel with a few drops of water and exposed to a temperature of about 75°, its decay is hastened very materially, but apparently more from the presence of infusorial life than from the parasitic fungi. The latter seem to prepare

the way for a species of angulula, which appear in great numbers monads, water-mites, vibrions and bacteria, by breaking up the proximate elements. These being destroyed, or changed in composition, a watery juice is always formed where the fungi rested. Whenever the conditions are favorable for aquatic life, it appears in profusion. Torula, a low form of fungi budding-cells, set in, causing fermentation, and assisting in the general destruction of the onion. This explains the cause of its rapid decay in the field, when once attacked by "mildew and smut," under high temperature and moisture.

Moisture, and a temperature of about 70°, seem to have the effect of changing the sectional spores from their original appearance, as represented in Fig. 18, 2, to that in Fig. 19, 10, in which a greater number of divisions is observed, containing sometimes as many as eleven cells, and all containing slightly elliptical spores. To ascertain the true course of the transformation of the onion-blight and smut will require further observations; but I think it probable that the so-called smut is but a higher stage of the secondary globular yellow fruit seen on the mycelium. See Fig. 18, 6. The micro-chemical observations made fully sustain the views of the onion-growers, viz, that the onion-smut is very tenacious of life.

Fig. 19.

In many localities, rank weeds might be procured in great abundance on fields infested by the fungi, (on the field alluded to, weeds three feet in height grew in profusion;) were they cut down, sun-dried, spread over the field, and with them brushwood and all useless materials found about the farm burned, the surface-spores, and all germs of parasitic life within reach, would be consumed, and caustic potash, lime, and charcoal would be liberated and diffused over the field for the benefit of the succeeding crops.

THE COTTON MOVEMENT.

The New York Cotton Exchange presents the following figures as the sum of receipts of cotton, (in bales, which average about 465 pounds,) and the shipments to foreign countries, during two years past, the commercial year ending September 1, and covering substantially, though not exactly, the crop of the preceding calendar year:

	Commercial movement.	Exports.
Crop of 1870	4,347,006.	3,169,009
Crop of 1871	2,974,351.	1,957,314

Of this movement of the past year, the receipts of New York amount to 724,615 bales; those of New Orleans, 1,079,129.

The interior and local movement, in detail, is thus given:

	Receipts.		Exports.		Stocks on September 1.	
	1870–'71.	1871–'72.	1870–'71.	1871–'72.	1871.	1872.
Galveston	294,452	179,612	217,537	116,583	10,490	5,115
New Orleans	1,427,588	940,211	1,293,321	891,776	25,323	6,218
Mobile	400,978	286,066	287,006	140,045	5,466	960
Savannah	734,243	457,159	467,050	295,909	3,215	844
Charleston	354,704	273,767	174,665	108,856	3,443	2,825
New York	522,186	127,272	679,629	370,964	38,875	18,939
Florida	10,754					
Boston, Baltimore, Norfolk, &c	212,918	418,599	49,793	30,862	12,228	13,998
	3,957,823	2,682,686				
Overland, southern consumption and corrections	389,183	291,665		Cor.2,319		
Total	4,347,006	2,974,351	3,169,009	1,957,314	99,040	48,899

The total movement and home consumption of our cotton for seventeen years past is thus given on the same authority:

Year.	Commercial crop.	Total crop.	Consumed north.	Consumed elsewhere.
1871–'72	2,854,351	2,974,351	977,540	120,000
1870–'71	4,255,766	4,347,006	1,072,426	91,240
1869–'70	3,034,749	3,114,592	777,341	79,843
1868–'69	2,260,567	2,433,770	821,924	173,203
1867–'68	2,430,893	2,599,241	799,817	168,348
1866–'67	1,951,988	2,232,660	573,367	280,672
1865–'66	2,151,043	2,277,683	540,652	126,640
1860–'61	3,656,086	3,849,469	650,357	193,383
1859–'60	4,675,770	4,861,292	792,521	185,522
1858–'59	3,851,481	4,018,914	760,218	167,433
1857–'58	3,113,962	3,257,339	452,185	143,377
1856–'57	2,939,519	3,093,737	665,718	154,218
1855–'56	3,527,845	3,665,557	633,027	137,712
1854–'55	2,847,339	2,982,634	571,117	135,295
1853–'54	2,930,027	3,074,979	592,284	144,952
1852–'53	3,262,882	3,416,214	650,393	153,332
1851–'52	3,015,029	3,126,310	588,322	111,281

CO-OPERATIVE DAIRIES IN SWEDEN.

The following statement of the extension of the distinctively American idea of associated effort in dairying, is from the German of E. de Salviate, secretary of the state board of agriculture of Prussia, translated for the Department of Agriculture by A. W. Angerer, of the Bureau of Statistics of the Treasury Department:

The success gained by the cheese-associations in Switzerland, and by a few similar establishments in Southwestern Germany, as well as by farming associations in North America, has led to the formation of milk-associations in England, especially in Derby. They have demonstrated that, under certain conditions, the manufacture from milk on a large scale, extended over a considerable area, must have many advantages over individual enterprise. In Sweden, also, these associations have been formed, and the first report of the dairy stock association of Stockholm coincides with the first annual account of the milk association in Derby.

The advantages claimed by the committee of the milk association are in part the

same which support this enterprise in Sweden, only substituting butter for cheese; for here the first objects of manufacture were butter and cheese, while the making of cheese has latterly been confided to single producers, making butter the chief production of the association. The report of the British association points out the following advantages:

1. Milk in large quantities, in the preparation of Cheddar cheese, yields a much larger amount of curd than small quantities.

2. The expenditures for wages are proportionally much smaller in a large industry, and may be reduced to a minimum.

3. The advantage in cheap implements and buildings is very considerable.

4. The loss of raw materials is far less in a large factory. Less milk yields more cheese.

5. The loss in handling the cheese prepared, but yet unmatured, is proportionately much larger in small establishments.

6. Everything pertaining to the cheese manufacture on a large scale admits of savings, in the manner of working up the raw materials.

Before the present stock association was formed in Sweden, there existed already a large dairy established by Mr. Lidholm, which transformed into milk and butter 6,000 cans (41.48 gallons, United States,) of milk per day, the products being shipped by railroad in winter and by steamship in summer, to the capital. This establishment has been incorporated by the present stock association, which was chartered by law of October 1, 1870, with a capital stock of 1,000,000 Swedish dollars, ($275,600,) of which thus far 350,000 Swedish dollars ($96,460) have been issued.

Very soon the company found it of advantage, instead of the milk in its natural state, to purchase the cream separate, in order to give chief attention to the manufacture of butter. Agents concluded contracts with large milk producers for delivery of the cream, and the farmer soon discovered that the cream, while the skimmed milk would be profitable at home as food for young cattle and swine, yielding them thirty-two oere per can, (or 12.876 cents, gold, per gallon, United States,) instead of twenty oere (7.9 cents, gold, per gallon, United States) per can as before.

The quantities of milk purchased through the agents during the first quarter of the operations was 326,144 cans, (225,490 gallons, United States,) and from the report appears that the production of 1 can of cream required 7.1 cans of milk, and as the above quantity of milk yielded 50,620 pounds of butter, it averaged 6.3 cans of milk to 1 pound of butter, (4.646 gallons, United States, of milk to 1 pound, United States, of butter.) The production of fresh cheese required 1.88 cans of milk for one pound, (1.386 gallons, United States, per pound, United States.)

From these facts the conclusion is drawn that the result is not favorable as regards the yield of butter, but very satisfactory as regards the yield of cheese, which clearly proves that the cream formation was imperfect and that a good portion of the butter contained in the milk passed into the cheese. The chief cause of this the report ascribes to the fact that, in October and November, the depots receiving the milk were short of ice and could not keep sufficiently cool the temperature of the water vessel in which the formation of cream takes place. Beyond the cream realized from the milk purchased, the quantities directly obtained were: October, 24,917 cans; November, 27,288 cans; December, 25,900 cans; January, 31,590 cans; February, 31,640 cans.

The price paid for milk varied with the season and locality, from 16 to 22 oere per can, (6.36 to 8.77 cents, gold, per gallon, United States,) the average being about 19 oro per can, (7.57 cents, gold, per gallon, United States.) For cream was paid, in October, 80 oere per pound of butter realized therefrom, (23.53 cents, gold, per pound, United States;) in November and December, 85 oere pound, (25.02 cents, gold, per pound, United States,) and during the first months of this year 90 oere per pound, (26.47 cents, gold, per pound, United States.) In these first transactions the company aimed at profits of one oere per can (0.0386 cent, gold, per gallon, United States) of milk, and 5 oere per pound (1.47 cents, gold, per pound, United States) of butter.

According to their first charter the association could extend its operations in a limited district only; but a decree of May 12, 1871, removed this limitation, and soon they formed ten branch establishments. The total production of butter was, (in Swedish pounds:)

	October. 1870.	November. 1870.	December. 1870.	January. 1871.	February. 1871.
Stockholm	32,235.88	36,581.00	35,822.05	44,115.45	45,037.80
Nykoping		315.10	1,603.40	233.17	3,146.70
Eskilstuna		490.00	7,047.20	10,547.55	11,876.18
Oerebro			1,663.70	6,526.22	13,234.17
Total	32,235.88	37,305.10	46,136.35	63,523.39	73,294.85

From October to December, cheese to the number of 1,207, weighing 45,045 pounds, was manufactured in fourteen locations. Of butter-milk was obtained, (Swedish cans:)

	October.	November.	December.	January.	February.
Stockholm	19,018	22,400	22,600	25,265	23,655
Nykoping	.....	224	786	1,382	1,710
Oerebro	.....	.....	556	2,211	5,085

Regarding the prices obtained for their products, the Stockholm association publishes the following current rates in their competition with others in the London market. The figures are in shillings per hundred-weight, (112 pounds:)

Date.	Stockholm association.			Norman.	Dutch.	Irish.					
						Table-butter.			Ordinary.		
	First.	Second.	Third.			First.	Second.	Third.	First.	Second.	Third.
November 24	136	.....	.....	140	134	134	124	118	130	120	112
December 2	140	138	.....	154	140	138	127	117	130	123	110
December 7	140	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
December 14	140	.....	.....	.....	140	148	130	118	130	123	113
December 21	140	130	112	.....	140–154	152	130	120	138	126	114
January 3	150	140	.....	.....	150	152	146	130	146	.....	122
January 17	152	144	120	.....	150	152	146	130	146	140	121
January 31	156	146–50	130	.....	.....	.....	.....	.....	.....	.....	.....
March 20	152	140	.....	160	150	150	150	140	148	148	126

The establishment at Stockholm, sold to inland customers in October 1,448.50 pounds; in November, 1,447.50 pounds; in December, 1,716.25 pounds; January, 1,981.50 pounds; February, 1,875 pounds of butter. The maturing of cheese requires, in general, six months; a small part of the production only had been sold at 21 oere per pound.

From the Stockholm establishment cheese was sold: October, 7,700 pounds; November, 8,800 pounds; December, 11,420 pounds; January, 11,052 pounds; February, 12,576 pounds.

By contract the establishment furnished on every week-day 2,000 cans, (1,382.7 gallons, United States;) on each Sunday, 1,200 cans (829.6 gallons, United States) of skimmed milk, at 14 oere per can, (5.58 cents per gallon, United States,) and all butter-milk obtained at 7½ oere per can, (7.82 cents per gallon, United States.)

The whey from the manufacture of cheese, as far as not fed to the swine owned by the establishment, was disposed of at 1 oere per can, (0.397 cent per gallon, United States.)

The efforts of the company to reduce the expense of transportation has met with great success. They now receive the cream in high vessels of tinned sheet-iron, from distances of fifty to seventy English miles, in winter per wagon, in the summer per ship, &c.; nothing is drawn from the immediate vicinity of the capital.

The smallest quantity accepted is 10 cans, (26.17 liters or 6.914 quarts, United States.) Immediately after purchase, the cream delivered under one name is weighed, and then (especially in the warmer season) placed into large oblong vats filled with ice-water, after which each quantity under one name is converted into butter, in order to notice the result in butter of each and to compute its higher or lower price. One can (6 pounds = 5.62 pounds, United States) of cream yields at an average 1¼ pounds (1.405 pounds, United States) butter. (One United States gallon cream = 2.50 United States pounds butter.)

The butter destined for exportation is variously treated; that for the London market has added 5 or 5½ per cent. of salt; for the Scotch market 4 per cent. only, and that for St. Petersburg (Paris butter from boiled cream) remains unsalted.

The butter prepared in the Stockholm establishment leaves daily from 2,000 to 3,000 cans (1,382 to 2,074 gallons, United States) of butter-milk, which, as before stated, sells at 7½ oere per can, (2.84 cents per gallon, United States.) The butter is prepared in five vats, 3 each of 60 cans, (41.48 gallons,) and two smaller. Care is taken that the temperature of the cream, when filled into the vats, has 12° (celsius) in the warmer, 14° in the cold season. Even in summer the cream is not suffered to pass above 14°, and in order to regulate the temperature a thermometer-pipe is attached to each vat, and the required degree can be enforced by addition of ice-water. The vats are upright wooden vessels, ranged in one line and put in motion by a steam-machine of four-horse power.

On the first day the butter gained is washed and then pressed, after which it is placed in cylindrical sheet vessels, which are standing over one night in ice-water. The next day another pressing of the butter takes place, when it is packed for shipment. During this process it loses about 3 per cent. in weight. In August, 1871, a pound of butter cost about 90 oere per pound, (26.41 cents per pound, United States,) and the Paris butter 1 rixdaler, (27.56 cents, gold, United States.) The price of butter is fixed at the beginning of each month. The trade with England draws at three days' sight, which secures a rapid return of the capital invested.

Ice is obtained in Stockholm at 30 oere per 100 pounds Swedish, (8.82 cents, gold, per 100 pounds, United States;) the establishment, from July 1 to October 1, consumed 5,000 quintals. A cover of saw-dust and turf-earth keeps the ice with a loss of only 15 per cent. Stores of ice are very large in Stockholm, and the climate admits of safe places of keeping, so that ice two years old is always at disposal.

The association in Stockholm exported not only the products of its own and branch establishments, but also of other co-operative and private dairies, at a commission of 3 per cent., under guarantee for the payment of the products sold. The following shows the total exports:

	FIRST CLASS.		SECOND CLASS.		THIRD CLASS.		TOTAL.	
	Kegs.	Pounds.	Kegs.	Pounds.	Kegs.	Pounds.	Kegs.	Pounds.
Central station, Stockholm	6,155	603,902	573	55,352	12	1,197	6,739	660,452
Branch station, Oerebro	1,273	120,057	444	43,052	32	3,109	1,749	168,218
Branch station, Skultuna	921	90,436	620	60,372	32	3,105	1,573	153,913
Branch station, Nyköping	787	76,977	69	6,716	3	305	859	83,998
Branch station, Eckilstima, (6½ months)	190	19,105	45	4,420	.....	.....	235	23,525
Branch station, Ultuna, (8 months)	197	19,614	17	1,675	.....	.....	214	21,289
Branch station, Nortelji, (1 month)	6	446	1	63	.....	.....	7	509
Other dairies	2,888	280,759	636	64,118	3	310	3,527	344,187
Total	12,417	1,211,296	2,404	235,769	82	8,026	14,903	1,456,091

Further details, especially the financial results which have been successful, are promised at an early day. A statement of the products of the Stockholm establishment and its branches by months (of the year 1871) shows a decrease in the last part of the year, ascribed to the great number of young calves at that season.

Month.	Total product.	Central station, Stockholm.
	Pounds.	*Pounds.*
January	63,523	44,115
February	73,295	45,038
March	101,230	61,890
April	113,860	65,840
May	135,550	72,420
June	117,880	68,680
July	124,920	76,530
August	105,070	65,380
September	97,740	58,960
October	83,890	52,700
November	67,260	45,090
December	67,500	38,980
Total	1,201,718	695,623

	Pounds.
Total exported	1,456,891
Less	344,187
Total	1,112,704
Sold in Stockholm or neighborhood	89,014
Total production	1,201,718

Swedish measurement.—1 pound = 0.93697 pound, United States, avoirdupois, (or 1 pound, United States = 1.067 pounds, Swedish;) 1 quintal = 100 pounds, Swedish; can (kande) = 0.69139 gallon, United States; 1 gallon, United States, = 1.446 cans. Swedish; 1 rixdaler = 100 oere = $0.2756 gold, United States.

Results of agricultural expositions in Prussia during the year 1871. *Prepared for the Department of Agriculture, by A. W. Angerer, of the Bureau of Statistics of the Treasury Department.*

Expositions by the central agricultural associations of—	Number.	Receipts in thalers.					Tickets.		Number of expositors.	Exposition of animals.							
		From the state.	Central agricultural associations.	Special agricultural associations.	Other, inclusive from tickets.	Total.	Number sold.	Gross receipts.		Total number on exposition.	Number of—						
											Horses.	Cattle.	Sheep.	Goats.	Swine.	Poultry.	Other.
Prussia	4	250	100	352	1,911	2,613	4,198	1,399	212	974	323	276	238	.....	123	14	.....
Brandenburg	15	100	1,186	1,242	2,668	5,196	7,596	2,182	698	1,144	427	263	188	14	77	95	80
Pomerania	5	673	700	18	1,498	2,889	600	100	65	562	458 104*	.....	.....	.....	.....	.....	.....
Silesia	20	.....	1,270	866	14,220	16,356	35,985	13,893	693	1,202	404	714	79	2	156	.....	.....
Saxony	8	1,250	.....	1,007	1,718	3,975	6,152	1,668	702	1,751	820	517	272	23	90	29	.....
Schleswig-Holstein	12	1,150	350	2,431	4,040	7,971	12,782	2,919	1,262	1,477	383	863	149	1	58	23	.....
Hanover	57	2,650	3,029	4,709	12,223	22,611	29,414	11,745	2,378	5,295	1,353	2,094	593	16	654	531	.....
Westphalia	31	1,154	1,278	4,726	10,142	17,300	41,711	8,982	2,479	3,575	1,215	1,865	74	68	265	90	8
Hesse-Nassau	4	720	1,578	140	3,395	5,833	23,896	3,220	254	311	6	277	4	.....	16	8	.....
Rhenish Prussia	12	975	511	1,434	13,272	16,192	20,621	13,390	784	960	167	553	60	12	116	36	16
Hohenzollern	1	.....	172	28	.....	200	4,000	914	80	112	36	54	10	.....	12	.....	.....
Total, state of Prussia	169	8,922	10,174	16,953	65,087	101,136	186,955	60,412	9,607	17,363	5,592	7,476	1,667	136	1,567	826	104

* Young colts.

Results of agricultural expositions in Prussia, &c.—Continued.

Expositions by the central agricultural associations of—	Number of expositors—		Machines and implements.			Prizes awarded.					The prizes were awarded on—										
	Of products of field, garden, orchard.	Of bee and silk culture.	Number of expositors.			Amount in money.	Consisting in—			Diplomas.	Horses.	Cattle.	Sheep.	Goats.	Swine.	Poultry.	Other animals.	Products of—		Machines and implements.	Other objects of agriculture.
			Prussian.	Foreign.	Total.		Medals.	Illustrations of animals.	Other gifts.									Field, garden, orchard.	Bee and silk culture.		
Prussia	27	.....	28	1	29	418	54	3	16	71	330	44	18	.....	26	.....	.....	.....	.....	.....	.....
Brandenburg	90	2	101	.....	101	2,619	38	.....	2	24	1,461	283	160	3	65	15	15	399	5	174	39
Pomerania	56	9	.....	.....	.....	1,202	14	.....	19	54	531	.....	.....	.....	.....	.....	.....	656	15	.....	.....
Silesia	21	2	235	.....	235	2,914	15	1	11	.....	1,228	1,079	57	.....	121	.....	.....	136	10	282	.....
Saxony	18	5	13	21	34	1,774	21	6	59	5	897	731	119	4	99	3	.....	13	2	6	.....
Schleswig-Holstein	65	8	116	.....	116	3,517	4	.....	2	298	1,466	1,594	151	.....	115	12	.....	149	.....	30	.....
Hanover	413	9	544	54	598	10,503	.....	63	50	303	5,818	3,147	293	13	674	38	53	214	11	189	53
Westphalia	227	6	58	9	67	4,882	17	3	6	38	1,751	1,978	42	34	285	26	6	162	47	358	193
Hesse-Nassau	38	.....	48	.....	48	2,007	1	.....	.....	19	54	435	7	.....	35	6	.....	.....	4	.....	1,466
Rhenish Prussia	320	82	67	1	68	2,545	66	.....	31	51	519	621	27	9	90	20	16	275	162	95	779
Hohenzollern	.....	.....	.....	.....	.....	195	.....	.....	.....	.....	58	118	6	.....	13	.....	.....	.....	.....	.....	.....
Total, state of Prussia	1,277	123	1,210	86	1,296	32,575	230	76	196	863	14,113	9,930	850	63	1,523	120	90	2,004	256	1,064	2,530

FACTS FROM VARIOUS SOURCES.

SILK-CULTURE IN KANSAS.—In the Annual Report of this Department for 1870 it was mentioned that Mr. E. V. Boissiere, a wealthy French gentleman, had engaged in the culture and manufacture of silk at a place which is now called Silkville, near Williamsburgh, in Franklin County, Kansas; and a general description was given of the buildings and machinery already completed by Mr. Boissiere, and of his prospective arrangements for extending his enterprise. The Department has received a letter from Mr. Boissiere, under date of the 12th instant, in which he makes the following statement of the result of his first experiments during the past season:

I commenced the weaving of silk-velvet ribbons at this place in 1869, hoping to make it a successful business. I conceived the idea of attempting, in connection with it, to raise the silk itself. Accordingly, I procured from France, and planted in the spring of 1870, a sufficient quantity of the seeds of the white mulberry, the leaves of which constitute, almost exclusively, the food of silk-worms in that country. The seeds germinated satisfactorily, and produced trees which have made a remarkably rapid and luxuriant growth. I have 10,000 of them, yielding in the proper season as much, and apparently as good foliage as could reasonably be desired.

Last spring I received from France three ounces of silk-worm eggs. Of these, two ounces (one ounce each, of the yellow and white varieties) hatched on the 27th of April. They appeared to do well until the time of spinning, about the 2d day of June, when the worms died in such large numbers that the yield was only 20 pounds of cocoons, instead of 200 pounds, which is understood in France to be the average yield from two ounces of eggs. The third ounce, which I considered more promising than the others, and on which I relied more confidently, hatched the 15th day of May. The worms were at first lively, and appeared perfectly healthy, and so continued until the intensely warm weather of the first part of June, when they began to sicken and die, and so many of them died before spinning that I obtained barely 5 pounds of cocoons—only one-half, proportionally, of the scanty yield from the first hatching. It is perhaps proper to remark, that the weather, during the months of May and June last, was especially unfavorable to silk-worms, being very wet, and heavy thunder-showers being frequent. But, besides these adverse circumstances, which may be regarded as only occasional, I suspect that French silk-worms, having become habituated to the comparatively moderate summers of Europe, cannot well endure the change to the sultry summers of Kansas. I hope for better success with the Japanese variety, with which I propose, if possible, to experiment next year. From the cocoons produced by the first hatching this year I obtained very good eggs, but I have more confidence in Japanese eggs.

MOULE'S EARTH-CLOSET.—Dr. Fergus, of Glasgow, in a recent paper read before the Medico-Chirurgical Society of Edinburgh, on the sewage question, makes the following remarks upon the earth-closet system of the Rev. Henry Moule, of England, which was fully described, with drawings illustrative of its mechanical arrangement, in the Annual Report of this Department for 1871:

Mr. Moule's earth-closet has done well in private houses, asylums, and small villages in this country, and in India has been a very decided success. The great objection to its use in towns is the bulk of the material required. This objection is removed by employing, as Mr. Stanford proposes, seaweed charcoal instead of earth. As a very small quantity of charcoal is sufficient, by an improved closet, it is expected that even less than weight for weight of excreta will be found sufficient. I have repeatedly seen Mr. Stanford's process in operation, and am convinced it is in every way well worthy of trial; as it satisfies, in all respects, whatever the most ardent sanitarian could desire. The product from the closet is a black mass, somewhat like cinders, free from smell, and without the least appearance of fecal matter. Mr. Stanford considers that 8 cwt. per head per annum is sufficient, and that this need only be removed once a year; and the reservoir of char at the top of the house need only be replenished once a year. The closets are arranged to be quite automatic, and require no attendance from within. Mr. Stanford values the char after use at 8*s.* a head per annum, and proposes to burn it in revolving retorts, and to collect in suitable condensers the gas-liquor, tar, and gas. The charcoal increases at each reburning, and therefore the

plan is self-supporting, unless, indeed, the increased value of the char should render it advisable to sell it.

STEAM-CULTIVATION IN SCOTLAND.—There is evidence of great improvement in the agriculture of the north of Scotland; and it appears to have been promoted by reducing the size of home farms to smaller and more manageable dimensions, few of them now exceeding 200 acres, by a judicious system of rotation of crops and a more liberal use of manure; and by steam cultivation. It is claimed that the introduction of the steam plow has been the chief agent of the great changes which have been produced in the direction of profitable husbandry. A larger breadth of land has been brought into cultivation, and immense tracts of waste land, hitherto covered with heath, have been reclaimed and rendered capable of producing good crops of cereals, vegetables, and grasses. Thousands of acres of moss, and heavy clay, and hill-side lands, which could not be reached by ordinary methods of culture, after being trenched and drained have been brought by the steam plow and harrow into a cultivable state. Where neither men nor horses could be employed, the steam plow has been made to tear through everything. To avoid the risk of the breakage of gear in rough land, where the plow is liable to come against boulder stones and old tree-roots, a plow with a revolving coulter has been introduced—that is, a coulter which will cut its way smoothly until it meets with a root or stone, when it will pass over it with a rotary motion.

THE FOREIGN HOP-CROP.—The hop crop in England the present year is said to be remarkably fine, being large, heavy in quantity, and superb in quality. It is described as being the fifth largest crop of the century. The growth will average half a ton per acre. As 60,000 acres were cultivated, the yield will be, therefore, 30,000 tons, which is said to be an excess of 7,500 tons over the annual requirements of the brewing trade of the country. The Belgium hop prospects are also represented as being remarkably heavy; and at Nuremberg the crop will be from one-third to one-half more than last year. From Pleinfield, in the celebrated Spält district, a good average produce is expected. In the lower Palatinate (Rhenish Bavaria) one-fifth more hops were grown the present year than in the last season. From Hanover, likewise, and indeed from almost all the hop-growing districts of Europe, alike favorable accounts are received. The German, French, and Belgian crops are represented as being of superior quality, the portion of brown or diseased hops being unusually small. The estimated value of this year's crop in England is $18,000,000. Although there is an increased consumption in Germany, France, and Belgium, there will be a considerable surplus for exportation in all those countries. In the United States the crop will not supply the home demand, although, according to the agricultural census, the crop is sevenfold what it was in 1850, the State of New York producing two-thirds of the whole amount; so that large importations from both England and the continent are anticipated.

NEW SYSTEM OF LAND-TENURE IN EGYPT.—In the monthly report of the Department for July, reference was made to the rapid increase of the area of cultivable lands in Egypt, resulting from the wise improvements of the present Khédive, whose aim is to ameliorate the system of land tenure, so that there may be something like private ownership of land. Egypt proper is estimated to possess about 5,000,000 acres of arable land, four-fifths of which is state property, the tenants who occupy it having nothing like a freehold or fee simple, and no title in fact

or privilege in the land, except that of occupancy and enjoyment of its produce by paying an annual tax. This tax is heavy and onerous, averaging between seven and eight dollars an acre upon the lands of the delta—that portion of the country which is enriched by the Nile—and a much less, but yet comparatively burdensome, sum upon the inferior lands in a country rarely visited by showers. The new system which has been initiated is to allow the tenant, by the payment of a sum equivalent to six years' taxation, to become, in a partial sense at least, the owner of the land which he occupies, with all the advantages attaching to a freehold, except the ultimate right to transfer or sell.

Cross between the Zebu and European cattle.—The Department has recently received from Prussia, in exchange for its own reports, a variety of official agricultural publications. The "Landwirthschaftliche Jahrbücher," which is the organ of the Royal Prussian agricultural department, contains a notice of some experiments on the cross between the zebu or Indian ox *(Bos Indicus)* and European cattle, by W. Nathusius-Konigsborn. The doubts that have existed in regard to the fecundity of this cross led to the experiments which, the writer thinks, must forever set the question at rest. The male zebu made use of was a yearling calf from the zoölogical gardens, of the peculiar bluish white color characteristic of the zebu race. Four heifers of Holland stock were got with calf by this animal, and produced two heifers and two bull calves, all of which were successfully raised. Though the dams were variously colored, all the calves had white stars in their foreheads. When they arrived at suitable age they were bred with each other and with other cattle, and both sexes proved in every respect capable of propagating their race. The amount of milk given by the half-bloods was about 500 quarts per annum. This was so much below the ordinary average as to prevent all hope of their being a desirable breed. In addition the oxen, from which much was expected in speed and endurance, proved so incorrigibly obstinate as to defy all efforts to train them for the yoke, lying down on the smallest provocation, and in one case where it was necessary to lead one of them a short distance, the animal died the next day, it was supposed from the effects of anger and excitement. They acted much more like half-tamed wild beasts than like domestic cattle. The only redeeming feature was the quality of their flesh, which, in those that were sent to the butcher, proved to be excellent.

Tobacco in Owen County, Kentucky.—R. W. Orr, secretary of the County Agricultural Association, writes to the Department, under date of October 15, that the tobacco crop of that county for the year 1872, in quality, is much superior to any other for the past five years, and that Owen County has the finest crop this year of cutting leaf of any county in the State, or even the Union; and it is now claimed that that kind of tobacco is the finest placed upon the Cincinnati or Louisville markets, which are the principal points for the sale of their crop. It is claimed that the day is not far distant when the Owen County tobacco will be favorably known all over the world for its superior qualities for chewing.

The eleventh annual exhibition of the Owen County Agricultural Association, just closed, proved quite a success, holding five days. The third day is called the tobacco day, upon which are exhibited samples of the best cutting leaf tobacco, White Burley, Red Burley, and Twist Bud. The show of tobacco on that occasion was the finest ever exhibited there, and the samples were afterwards sold at public auction

for one dollar per pound, and were purchased by one of the largest tobacco firms in Cincinnati.

Opium-poppy in France.—The cultivation of the opium poppy in France is steadily increasing. It now occupies 50,000 acres, of the value of 4,500,000 francs, yielding opium to the value of 2,000,000 francs a year. Different samples of opium, raised in various parts of Europe, are said to have yielded from 8 to 13 per cent. of morphine.

Orange-cultivation in Louisiana.—In the orange district in Louisiana there is a gradual extension of groves and an increase in production. In Plaquemine Parish about 2,000 acres are occupied by orange groves. Usually there are 100 trees to the acre, and a healthy tree will bear from 500 to 2,000 oranges, 1,000 being a fair average. They are worth on an average $10 a thousand.

Hops in California.—A hop circular, issued August 1, by Miller & Co., of San Francisco, gives some interesting facts relative to hop-growing in that State. There were under hops in the State in 1870 441 acres; 1871, 332; 1872, 618. There were exported from the port of San Francisco in 1870, 383,982 pounds; in 1871, 223,475 pounds; in 1872, up to August 1, 46,697 pounds. The imports were, in 1870, 1,137 bales; in 1871, 825 bales; in 1872, up to August 1, 479 bales, a bale being about 200 pounds. It will be noticed that in 1871 there was a large falling off from 1870 in acreage, exports, and imports, but a great increase of acreage in 1872, caused by a growing appreciation of the home product on the part of brewers. The estimated yearly consumption in the State is 450,000 pounds. The product in 1870 was 557,118 pounds; in 1871, 277,055 pounds. There was, August 1, a prospect of a fair average crop this season.

Improvement of soil by green-manuring.—A correspondent at Port Gibson, Mississippi, believes a large portion of the South have reached the conclusion that their prosperity henceforth must depend mainly on improvement of the soil, and that, for securing this result, there is no other means so abundant, certain, and cheap as green-manuring. He also expresses the opinion that, in that latitude, the most valuable of the grains for forage, winter-pasture, and green-manuring is rye.

A fruit-growing region.—A correspondent in Lunenburg County, Southern Virginia, represents that fruit is easily produced in that region, but scarcely any attention is given to its culture, none being raised for market. Peaches grow almost spontaneously, and ripen from June till October, but are only raised for swine and for making brandy. Though pears grow and yield abundantly, only the poorest varieties are raised, mainly for the manufacture of perry. All kinds of grapes which have been tried thrive, but few are cultivated. Said a neighbor, "What is the use, when, with my little hand cider-mill and a negro to help, I can go into the woods and in a half day make 10 gallons of as good wine as ever was drank?" Apples do well, though more liable to decay than further north. Plums and cherries do better than he has ever known them to do elsewhere. Wild strawberries, raspberries, dewberries, and blackberries abound, and prunes, pomegranates, quinces, and figs can be raised, and are, to some extent, in gardens.

Goodhue, Minnesota, Farmers' Club.—Harrison Lowater, secretary, writes that its members had under cultivation, in 1871, 139 farms, with areas in principal crops as follows:

Wheat, 6,126 acres, yielding 83,498 bushels, or 13.6 per acre.

Oats, 1,487 acres, yielding 63,888 bushels, or 43 per acre.
Corn, 610 acres, yielding 20,985 bushels, or 34.4 per acre.
Barley, 942 acres, yielding 28,959 bushels, or 30.75 per acre.

The number of farms represented the present season is 158, with 9,985 acres in wheat, 1,753 in oats, and 472 in corn. In 1871 the average acreage to a farm was, of wheat, 44 acres; of oats, 10.7; of corn, 4.4. In 1872, of wheat, 63.2; of oats, 11.1; of corn, 3.

EXPERIMENT IN GROWING POTATOES.—Mr. James Wells, of Chicopee, Massachusetts, plowed deep and harrowed a piece of green sward, designed for a garden; dug deep holes three feet apart each way, put sods in the bottom, grass side down, and on them cow-stable manure, about two quarts in each hill; covered this lightly with soil, cut one bushel of early rose potatoes so as to have but one eye in a piece, and put two pieces in a hill, 6 to 12 inches apart. The ground was kept free from weeds, and the hills made "high and large." The product was 51 bushels of potatoes, 48 of which were of suitable size for the table. The ground measured 4,280 square feet, or a fraction less than one-tenth of an acre; and, therefore, the crop was at the rate of over 500 bushels per acre.

BLACK-LEG.—Our correspondent at Western Park, Howard County, Kansas, represents that a cattle disease prevailing in that locality, and known as black-leg, attacks young stock in about the following proportions: 70 per cent. of calves, 25 per cent. of yearlings, and 5 per cent. of two-year-olds. He recommends feeding freely with salt as a preventive, and as an antidote, the tincture of aconite, which he has tried with some success.

EFFECTS OF COMMERCIAL FERTILIZERS IN COLD SOILS.—Our correspondent in Milton County, Northern Georgia, represents that by the use of commercial fertilizers that county has been rendered as productive in cotton as the southern portion of the State. It is an elevated region, situated on a spur of the Blue Ridge which divides the Mississippi and the Atlantic slope, and the soil is a cold red loam or rotten clay. The stimulating fertilizer gives the cotton-plant an early start, and the weather is seldom, if ever, hot enough to cause it to wither or rust.

ARMY OF SQUIRRELS.—Our correspondent in Jackson County, Arkansas, reports that squirrels in large flocks are traveling through the county, and destroying entire fields of corn. They are so plenty that as many as 125 have been killed in a day by one man.

DISEASE AMONG CALVES.—Our report for September from Lawrence County, Indiana, states that quite a number of spring calves have died in that locality of a disease which runs its course in from three to five days; the several stages being stiffness, disinclination to move, and loss of appetite.

TEXAS CATTLE-DISEASE.—It is reported that at a locality in Boone County, Missouri, about twenty cattle have recently died of Texas fever; also that in Bates County, and in Christian County, Illinois, the same disease has broken out and is spreading with fatal effects. In the two former instances its origin is traced to droves of Texas cattle passing through the places, and in the latter to a herd of the same brought into the place by a stock-man.

RAIN IN UTAH.—Our correspondent in Kane County represents that, while rains have been so abundant as to damage late crops in some locali-

ties, they have brought the county generally into a fine condition for the winter range of stock, and that, according to his own observation and reports from all parts of the county, stock was never in a better condition for winter than now.

CROPS IN GREELEY, COLORADO.—N. C. Meeker, of Union Colony, has had ten acres of land in cultivation this season, from which he has gathered crops as follows: 3½ acres of wheat, 75 bushels; 2 of corn, 50 bushels; 1 of oats, 30 bushels; 1 of sugar-beets, 7 tons; 2 of Hubbard squash, 6 tons; and a half acre of cabbage, 7 tons. He represents that, for want of thorough cultivation the yield of beets was only about three-fourths of a crop, and that the corn suffered from being too thick.

FRUIT IN KANSAS.—A correspondent in Cowley County reports that its prospects for fruit-raising are very promising. Young fruit-trees generally are doing well; peach-trees only three years old have borne fine fruit, and in another year the county may expect a full supply of peaches and small fruits, and a year later, of apples and cherries.

COCOA-NUT CABBAGE.—This new variety, recently introduced by the Department, has been tested by a correspondent in Mercer County, Ohio, who commends it as early, hardy, yielding good heads, and of better flavor than any other variety he is acquainted with.

CULTIVATION OF CINCHONA IN BENGAL.—The cultivation of cinchona trees in the district of Sikkin, Bengal, which was started in 1862 by Dr. T. Anderson, is said to be very profitable, and in this district there were under cultivation in March, 1871, the following species: 1,233,715 trees of *cinchona succi rubra;* 440,000 trees of *cinchona officinalis;* 33,400 trees of *cinchona calisaya*; beside 480,000 young plants of *cinchona succi rubra* in the nursery, which had been raised from the seed. The annual yield is about three hundred pounds of bark per acre.

THE AMOUNT OF ARABLE LAND OF THE NETHERLANDS.—Nearly one-fifth of the entire surface of the Netherlands is wholly unfit for cultivation, while more than another one-fifth is meadow-land; about 71,500 acres are market gardens; 60,000 acres are orchards; 47,500 acres are cultivated with tobacco; 35,000 with hemp; 375 with hops, (in one district only;) and 500 acres are wholly devoted to the cultivation of the bulbs of tulips, hyacinths, &c.

MARKET PRICES OF FARM PRODUCTS.

FOR OCTOBER, 1872.

Articles.	Price.	Articles.	Price.
NEW YORK.		NEW YORK—Continued.	
Flour, superfine State..per bbl.	$6 10 to $6 50	Rye .....do...	$0 80 to — —
extra State .....do...	7 10 to 8 00	Barley.....do...	1 07 to — —
superfine western ..do...	6 10 to 6 50	Oats, ...do...	38 to $0 46
extra to choice western, per barrel.....	7 10 to 11 25	Corn, western, mixed .....do...	64 to 65½
extra southern...per bbl.	7 70 to 10 00	Hay, shipping qualities..per ton.	20 00 to 21 00
choice southern.....do...	10 50 to 12 50	prime .....do...	24 00 to 30 00
Wheat, No. 1 spring...per bush.	1 58 to 1 63	Pork, mess .....per bbl.	14 00 to 14 25
No. 2 spring .....do...	1 50 to 1 57	prime .....do...	11 25 to 11 75
winter, red west'n..do...	1 63 to 1 73	Beef, plain mess .....do...	5 00 to 7 00
white, western ....do...	1 70 to 2 02	extra mess.....do...	8 00 to 10 00
		Lard, ...per lb.	8½ to 9¾

Market prices of farm products—Continued.

Articles.	Price.	Articles.	Price.
NEW YORK—Continued.		BALTIMORE.	
Butter, western ..... per lb.	$0 10 to $0 22	Flour, superfine ..... per bbl.	$5 00 to $6 25
State dairy ..... do...	20 to 32	extras ..... do...	6 50 to 8 50
Cheese, western dairy ..... do...	11 to 13	family and fancy ..... do...	8 00 to 12 00
State factory ..... do...	11½ to 14	Wheat, red southern .. per bush.	1 40 to 1 85
Cotton, ordinary to good ordinary ..... per lb.	15⅝ to 18¼	choice red ..... do...	1 90 to 2 00
low middling to good middling ..... per lb.	18⅝ to 20½	white ..... do...	1 60 to 2 00
Tobacco, lugs, all grades ... do...	9½ to 10½	Corn, yellow ..... do...	67 to 68
common to medium leaf ..... per lb.	10 to 11½	white ..... do...	72 to 74
Wool, extra pulled ..... do...	54 to 55	Rye ..... do...	75 to 85
California spring clip, per pound	33½ to —	Oats ..... do...	41 to 45
California fall clip, scoured, per pound	70 to 90	Hay, western, new prime, per ton	32 00 to 34 00
Texas ..... per lb..	37½ to —	old ..... per ton	34 00 to 36 00
N. Y. State fleece .... do...	55 to 60	Beef, mess city-packed .. per bbl	15 00 to 20 00
choice Ohio, XX .... do...	58 to —	extra ..... do...	23 00 to 25 00
BOSTON.		Pork, mess ..... do...	15 50 to — —
Flour, western, superfine .. per bbl.	5 25 to 6 00	Butter, western ..... per lb.	20 to 25
western extras ..... do...	7 00 to 9 00	Glades ..... do...	20 to 24
western choice ..... do...	9 25 to 12 00	Cheese, western factory ... do...	14½ to 15½
southern extras ..... do...	7 00 to 7 50	eastern factory .... do...	15 to 15½
choice Baltimore .... do...	10 00 to 12 00	Lard ..... do...	8¾ to 9
Wheat ..... per bush.	1 60 to 2 00	Cotton, ordinary to good ordinary ..... per lb.	— to 17⅜
Corn, southern yellow .... do...	74 to 75	low middling to middling ..... per lb.	18 to 18¼
western mixed ..... do...	71 to 73	Tobacco, lugs ..... per cental.	7 50 to 9 50
western yellow .... do...	74 to 75	common to medium leaf ..... per cental.	9 00 to 11 00
Rye ..... do...	85 to 90	Wool, fleece, common to fine, per pound	45 to 50
Barley ..... do...	75 to 1 10	tub ..... per lb.	53 to 56
Beef, mess ..... per bbl.	10 00 to 11 00	unwashed ..... do...	36 to 40
extra ..... do...	11 00 to 16 00	pulled ..... do...	40 to 43
Pork, prime ..... do...	11 25 to 12 00	CINCINNATI.	
mess ..... do...	15 75 to 16 00	Flour, superfine ..... per bbl.	5 25 to 6 00
Lard ..... per lb.	9 to 10	extra ..... do...	7 25 to 7 50
Butter, N. Y. and Vt ..... do...	15 to 28	family ..... do...	7 50 to 8 75
western ..... do...	12 to 23	Wheat, choice Kentucky, per bushel	1 75 to — —
Cheese, N. Y. and Vt. choice factory ..... per lb.	13 to 14¼	prime State .... per bush.	1 65 to — —
N. Y. and Vt. choice dairy ..... per lb.	12 to 13½	No. 1 winter red .... do...	1 55 to 1 75
Ohio factory, good to choice ..... per lb.	11 to 14	No. 2 winter red .... do...	1 52 to — —
Cotton, ordinary to good ordinary ..... per lb.	15½ to 18¼	Corn, white ..... do...	44 to 45
low middling to good middling ..... per lb.	18½ to 21	yellow ..... do...	44 to 45
Tobacco, lugs ..... do...	9 to 9¾	Oats, No. 1 ..... do...	35 to 36
common to medium leaf ..... per lb.	10 to 12	No. 2 ..... do...	32 to 33
Hay, eastern and northern, per ton	20 00 to 29 00	Rye ..... do...	70 to 72
western, choice ..... do...	— to —	Barley, choice ..... do...	95 to 97
Wool, Ohio and Penn .... per lb.	53 to 68	prime ..... do...	90 to 92
Michigan ..... do...	52 to 58	Hay, baled No. 1 ..... per ton.	19 00 to 21 00
other western ..... do...	52 to 57	baled lower grades ... do...	14 00 to 18 00
California ..... do...	20 to 45	Pork, mess ..... per bbl.	13 25 to 30 50
Texas ..... do...	35 to 45	Lard, city kettle ..... per lb.	8 to 8¼
pulled ..... do...	30 to 60	prime winter steam .. do ..	7½ to 7¾
combing-fleece ..... do...	67 to 70	Butter, western reserve .... do...	24 to 25
PHILADELPHIA.		Central Ohio ..... do...	21 to 23
Flour, superfine ..... per bbl.	4 25 to 5 00	Cheese, prime to choice factory, per pound	14½ to 15½
extras ..... do...	5 50 to 6 25	Cotton, ordinary to good ordinary ..... per lb.	15½ to 17¼
family & fancy brands. do.	7 75 to 10 50	low middling to good middling ..... per lb.	17⅜ to 19½
Wheat, western red ... per bush.	1 70 to 1 75	Wool, common to medium washed-fleece .. per lb.	47 to 48
amber ..... do...	1 85 to — —	medium to fine .... do...	48 to 50
white ..... do...	1 90 to 2 00	tub-washed ..... do...	50 to 55
Rye ..... do...	— to —	unwashed cloth'g .do...	30 to 35
Corn, yellow ..... do...	70 to —	unwashed, comb'g .do...	46 to 48
mixed ..... do...	68 to 69	pulled ..... do...	35 to 37
Oats, new white ..... do...	42 to 44	CHICAGO.	
old white ..... do...	49 to —	Flour, winter extras .... per bbl.	9 50 to —
Pork, mess ..... per bbl.	15 00 to 15 25	spring extras ..... do...	6 25 to 7 25
Lard ..... per lb.	9 to 9½	Wheat, No. 1 spring ... per bush.	1 23½ to 1 26
Cotton ..... do...	19 to 19½	No. 2 spring ..... do...	1 18½ to 1 20½
		No. 3 spring ..... do...	1 06 to 1 07
		Corn, No. 2 ..... do...	35½ to 37½

Market prices of farm products—Continued.

Articles.	Price.			Articles.	Price.		
CHICAGO—Continued.				NEW ORLEANS.			
Corn, rejected ..... per lb.	$0 34	to	$0 34½	Flour, superfine ..... per bbl.	$5 00	to	$6 00
Oats, No 2 ..... do...	23¾	to	23¾	extras ..... do...	7 00	to	8 50
rejected ..... do...	20¼	to	21	choice ..... do...	8 75	to	11 00
Rye, No. 2 ..... do...	55	to	—	Corn, white ..... per bush	65	to	—
rejected ..... do...	46	to	—	yellow ..... do...	—	to	—
Barley, No. 2 ..... do...	67	to	68½	mixed ..... do...	63	to	—
rejected ..... do...	38	to	48	Oats, ordinary ..... do...	37	to	38
Hay, timothy (on track) per ton.	15 00	to	17 00	prime to choice ..... do...	40	to	43
prairie ..... do...	10 00	to	11 50	Hay, prime ..... per ton	24 50	to	26 50
Pork, mess ..... per bbl	14 50	to	15 00	choice ..... do...	28 00	to	28 50
Beef, mess ..... do...	9 00	to	— —	Pork, mess ..... per bbl.	15 50	to	15 75
extra mess ..... do...	10 00	to	— —	Beef, mess, (Texas) ..... do...	11 00	to	11 50
Lard ..... per lb	7¾	to	8¾	Lard, tierce ..... per lb.	9¼	to	10
Butter, choice dairy ..... do...	25	to	28	keg ..... do...	11¼	to	12
fair to good ..... do...	16	to	22	Butter, choice western ..... do...	22	to	24
Cheese, New York factory. do...	14¼	to	15½	Goshen ..... do...	31	to	32
Ohio, factory ..... do...	13	to	14	Cheese, choice western .... do...	18	to	—
Wool, tub-washed ..... do ...	57	to	64	New York cream .. do...	18	to	19
fleece-washed ..... do...	30	to	53	western reserve ... do...	—	to	—
pulled ..... do...	44	to	47	Cotton, good ordinary ..... do...	17¾	to	18⅛
Flour, superfine ..... per bbl.	5 00	to	5 75	low middling to good middling ..... per lb.	18⅜	to	19½
extras ..... do...	6 00	to	7 50	Tobacco, lugs ..... do...	8½	to	9½
choice ..... do...	8 00	to	9 50	low leaf ..... do...	9½	to	10½
Wheat, spring ..... per bush.	1 15	to	1 25	medium leaf ..... do...	10½	to	11½
red ..... do...	1 40	to	1 85				
white ..... do...	1 55	to	1 90				
Corn, mixed ..... do...	36½	to	42	SAN FRANCISCO.			
yellow ..... do...	—	to	—				
white ..... do...	—	to	—				
Oats, white ..... do...	29	to	—	Flour, superfine ..... per bbl.	4 00	to	4 25
mixed ..... do...	27½	to	28	extra super ..... do...	4 50	to	4 75
Rye ..... do...	57	to	70	higher grades ..... do...	5 00	to	5 50
Barley ..... do...	55	to	1 00	Wheat, State ..... per cental.	1 45	to	1 65
Hay ..... per ton	14 00	to	22 00	Oregon ..... do...	1 60	to	1 65
Pork, mess ..... per bbl.	14 50	to	14 75	Corn, white ..... do...	1 70	to	1 75
Lard, tierce ..... per lb.	9½	to	9½	yellow ..... do...	1 60	to	1 62½
keg ..... do...	10½	to	11	Hay, State ..... per ton.	10 00	to	16 00
Butter, choice ..... do...	25	to	27	Pork, mess ..... per bbl.	17 00	to	20 00
medium to fair ..... do...	20	to	23	prime mess ..... do...	17 50	to	18 00
Cheese, Ohio factory ..... do...	14½	to	15	Beef, mess ..... do...	12 00	to	13 00
New York ..... do...	14¾	to	15½	Lard ..... per lb	10½	to	11½
northwest'n fact'y. do...	14½	to	15	Butter, overland ..... do...	20	to	25
Cotton, middling ..... do...	18	to	18¼	California ..... do...	30	to	45
Tobacco, lugs ..... per cental.	8 00	to	9 25	Oregon ..... do...	20	to	—
common leaf ..... do...	8 25	to	9 75	Cheese ..... do...	11	to	15
medium to good leaf, per cental	10 00	to	11 50	Wool, native ..... do...	12	to	20
Wool, tub-washed ..... per lb.	58	to	60	California ..... do...	20	to	25
unwashed ..... do...	30	to	38	Oregon ..... do...	30	to	35

MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

NOVEMBER AND DECEMBER,

1872.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1872.

MONTHLY REPORT.

DEPARTMENT OF AGRICULTURE,
Statistical Division, December 21, 1872.

SIR: I herewith present for publication a digest of returns of correspondence, showing the average yield per acre and price of each principal crop in the counties of the several States, with a statement of the condition and qualtity of certain farm crops; also a record of prices of farm products in the principal cities, and current statistical *data*, and the results of investigations in the several divisions of the Department.

Respectfully,

J. R. DODGE,
Statistician.

Hon. FREDERICK WATTS,
Commissioner.

AVERAGE YIELD AND HOME PRICE OF FARM CROPS.

YIELD PER ACRE.—The average yield of corn per acre, as reported by correspondents, stands highest in Iowa, 40.8 bushels, the Illinois average being 39.6, that of Indiana 39.8, and of Ohio 39.5. The average of the States of the fortieth paralled is within a fraction of 40 bushels, those of Pennsylvania and Nebraska being 39 bushels, and that of New Jersey 39.5 bushels. New England, with her garden-patches of corn, returns 31 bushels for Massachusetts and Rhode Island, 32.2 for Connecticut, 36.1 for Maine, and 38.2 for New Hampshire. In New York the average presented is 37.5. Texas makes the highest southern average, 28.5 bushels, declining to 24.3 in Arkansas, and 24 in Tennessee, and to 17.5 in Mississippi, to 13 in Georgia; the lowest average being 9.6 in Florida.

The highest wheat returns are those of Minnesota, California, and Texas; the lowest are those of South Carolina, the range being from 6.4 to 18.7 bushels per acre. The rate is materially higher in the Gulf coast States than in the Southern Atlantic States, increasing from Georgia westward.

The rate of yield for rye stands lowest in South Carolina, and highest in California, the range being from 6.2 bushels to 29.1 bushels. A reference to the tables will show the variation in these averages, which are in most cases higher than those of wheat.

The highest average for oats is 40 bushels for Nebraska; the lowest is 8 bushels for South Carolina. Averages ranging from 40 down to 30 bushels come in the following order: Nebraska, Iowa, California, Minnesota, Illinois, Rhode Island, Vermont, Connecticut, Missouri, Pennsyl-

vania, Wisconsin, New Hampshire, Texas, Kansas, Indiana, Ohio, and Michigan.

Kansas makes an average of 28.2 bushels for barley, and West Virginia 11.5. The only averages above 100 bushels of potatoes per acre are those of Minnesota, Texas, Oregon, Connecticut, Vermont, Massachusetts, and North Carolina.

The averages for hay range from seven-tenths of a ton in Maryland to 1.45 tons in Illinois.

Average rates of yield for other crops are presented in detail in the tables.

PRICES.—Prices of cereals rule comparatively low, corn especially bearing prices that can scarcely repay the expense of cultivation in many of the Western States. Where fuel is scarce and dear, the old practice of burning corn has been revived. In some instances it has been economically used in manufactories. There is a wide range of prices in the several counties in a State, those upon through lines of railroad showing higher rates; but wider differences are caused by disparities between local supply and demand. There are new counties in frontier regions, with small production and increasing population from immigration, in which prices are almost as high as in eastern cities.

Averaging the local prices of corn, the lowest rate is 18 cents per bushel in Nebraska and Iowa, while that of Kansas is 22, and Illinois 24. Going eastward it rises to 29 in Indiana, 34 in Ohio, 60 in Pennsylvania, and 62 in New Jersey. The range in New England is from 84 in Vermont to 95 in New Hampshire. The average for New York is 70 cents. One bushel of corn in Massachusetts appears to be worth five in Iowa. In the South the rate is highest in Florida, at $1.20 per bushel, and lowest in Texas, 43 cents. The price increases from Delaware to South Carolina, the rates being, in their order, respectively, 55, 57, 58, 62, and 96 cents; in Alabama 78, Georgia 86, and 88 in Mississippi and Louisiana.

The averages for wheat range between $1.95 in Massachusetts and 74 cents in Oregon, the next lower being, respectively, 78 cents for Nebraska, 83 for Minnesota, and 85 for Iowa. The crop being poor in Kansas and Missouri, local prices average in those States respectively, $1.42 and $1.41, about the same as in Tennessee and West Virginia.

For details of prices of rye, barley, oats, potatoes, hay, &c., reference is made to the tables.

CONDITION OF THE CROPS.

CORN.

At the close of the season, the crop ripened, mostly gathered in all parts of the country, and a sufficient amount of it "shucked" to determine its quality, it is manifest that a product as large as that of 1870 (not that of 1869, as reported in the census, which was a partial failure) has been produced. When the returns from distant points are completed, and calculations are perfected, it is probable that a crop of about 1,100,000,000 bushels will be indicated. Its intrinsic value in proportion to quantity is also somewhat larger than usual, the quality being above an average. Very little failed to ripen. Greater success than usual has attended efforts at corn-growing at high elevations, as in the

Rocky Mountain area, though it was injured at many points by frost, and is not deemed a safe crop at elevations of 5,000 feet north of 39°.

In the Carolinas the bottom-lands were in many places too wet for a crop, either in yield or quality, while the uplands gave results which were scarcely ever surpassed. As is ever the case, there were late plantings in all sections which were either injured by drought or failed of full condition and perfect maturity. There were in all the States fields undrained, in bad tilth, or suffering from poverty, which were partial failures, though the fructifying rains and generous warmth of the season went far to make amends for the cultivator's negligence.

The returns of "product compared with last year," which take into consideration both area and rate of yield per acre, average above 100 in all but seven States, viz: Rhode Island, 96; Delaware, 92; Maryland, 98; Virginia, 93; Florida, 87; Wisconsin, 99; Minnesota, 98. Those giving an increase are, Maine, 113; New Hampshire, 108; Vermont, 114; Massachusetts, 103; Connecticut, 105; New York, 110; New Jersey, 120; Pennsylvania, 115; North Carolina, 116; South Carolina, 108; Georgia, 118; Alabama, 123; Mississippi, 120; Louisiana, 130; Texas, 134; Arkansas, 109; Tennessee, 102; West Virginia, 106; Kentucky, 118; Ohio, 111; Michigan, 105; Indiana, 108; Illinois, 107; Iowa, 103; Missouri, 121; Kansas, 120; Nebraska, 105; California, 127; Oregon, 105. As the comparison is made with the crop of last year, which was relatively small in some States while large in others, these figures exhibit a wider range than if the comparison were only with average condition or yield per acre. The distinction should be observed between a report of "average condition" without reference to area, and aggregate product in view both of area and rate of yield—a difference which some unusually well-informed newspapers have of late failed to notice, thus making an apparent discrepancy in our reports from an awkward blunder in quoting them.

The following extracts from correspondence relate to quality of the crop and peculiarities of its condition:

MAINE.—*York:* Ears full. *Sagadahoc:* Reduced acreage, but better growth and maturity of the crop. *Cumberland:* Acreage reduced, but more sweet corn planted for canning; 2,000,000 cans put up, yielding to the farmer $90.000. *Waldo:* Excellent quality. *Somerset:* Never better. *Aroostook:* Crop good in spite of wet; first frost in the middle of October.

MASSACHUSETTS.—*Worcester:* Crop good and sound. *Franklin:* Molded badly in the shock. *Norfolk:* Quantity average; better ripened than usual.

RHODE ISLAND.—*Washington:* Reduced in quantity on sod-land 5 per cent. by white worms; depreciated in quality 10 per cent. by wet.

CONNECTICUT.—*New London:* Crop better than for years, though injured by wet. *Litchfield:* Extraordinary growth of stalks, and eared well.

NEW YORK.—*Delaware:* Full growth, but delayed in gathering by wet. *Kings:* The county does not raise half enough corn for home consumption. *Columbia:* Sound and good. *Chemung:* Average acreage; quality fine; large acreage of corn saved for fodder. *Albany:* Splendid and well-matured crop. *Steuben:* Crop good; conditions unusually favorable. *Warren:* Sound and bright. *Erie:* All sound. *Chautauqua:* Ripe and sound. *Ontario:* Great crop. *Rockland:* Crop unusually large and fine. *Onondaga:* Suffered from wet, but a superior crop.

NEW JERSEY.—*Sussex:* Good as ever known; scarcely a poor field to be seen. *Burlington:* Ripened better than last year. *Warren:* Above average; plump, solid, sound, and heavy. *Gloucester:* Crop almost unprecedented. *Hudson:* Better than was anticipated; frost delayed.

PENNSYLVANIA.—*Lawrence:* Crop good, but injured by wet. *Lancaster:* Average; would have been greater but for wind-storms. *Mifflin:* Very good. *Crawford:* Never better. *Armstrong:* Husked in good order; that part of the crop replanted on account of cut-worms is quite soft. *Union:* Average; would be more but for storms lodging it on the ground. *Montgomery:* Large, and generally good. *Chester:* Crop large and sound. *Bucks:* Never better; fodder will largely compensate the deficiency of hay. *Wayne:* Husking delayed by wet. *Centre:* Abundant and well matured.

MARYLAND.—*Baltimore:* Reduced slightly below average by drought; but this will be more than compensated by increased acreage and good quality. *Caroline:* Shortened a little, but excellent. *Washington:* Better than was expected; acreage increased. *Cecil:* Early planted corn injured by drought; late planted better.

VIRGINIA.—*Powhatan:* Crop short but supplemented by heavy oak-mast. *Pittsylvania:* Slight increase in product and quality. *Fluvanna:* Shortened by drought. *Middlesex:* Improved 10 per cent. since last report; quality good, but quantity still below average. *Nelson:* Shortened by drought. *Stafford:* Severely injured by drought. *Shenandoah:* Reduced by drought. *Madison:* Excellent on bottom-lands; indifferent on high lands. *Highland:* Never better. *Washington:* Crop fell off from drought. *Craig:* Affected by drought. *King and Queen:* Disastrously short; our main staple. *Lancaster:* Shortened by drought. *Buckingham:* Ruined on high ground; splendid on low land. *Cumberland:* Greatly improved by late rains. *King George:* Poor yield. *Prince Edward:* Five per cent. above last year. *Fauquier:* Better than was expected, on account of thorough cultivation. *Fairfax:* Somewhat injured by warm fall and rain. *Henrico:* Not so good as was last reported. *Gloucester:* Injured by severe drought. *Rockingham:* Good yield in spite of drought. *Westmoreland:* Exceedingly small crop; shortened by the terrible drought. *Southampton:* Suffered from drought and neglected for cotton.

NORTH CAROLINA.—*Chowan:* Good. *Bladen:* Heavy and good. *Greene:* Ten per cent. below average. *Gaston:* Uniformly good; 20 per cent. above average. *Mecklenburgh:* Twenty-five per cent. greater yield than last year. *Rowan:* Best crop in twenty-four years; excellent weather for gathering. *Alexander:* Bottom crops below average; upland crops above. *Allamance:* Best crops in ten years. *Perquimans:* Full average and good. *Wilkes:* Bottom crops average; uplands one-sixth above. *Stokes:* Not so good on bottoms, but better than usual on uplands. *Buncombe:* Extraordinary crop, flinty, sound, and heavy. *Iredell:* Best crop in fifteen years. *Stanley:* Good in spite of early insect ravages; especially fine on bottoms. *Edgecombe:* Ears light. *Jackson:* Gathers beyond expectation.

SOUTH CAROLINA.—*Fairfield:* More sound corn than in any season since 1864. *Greenville:* Neglected, as usual, for cotton. *Clarendon:* Full crop in some sections; in others two-thirds: *Orangeburgh:* Gathers well. *Chester:* Crop 50 per cent. greater and 25 per cent. better than last year. *Richland:* Unusually good.

GEORGIA.—*Muscogee:* Acreage and yield the same as last year; poor crop. *McDuffie:* Best crop for years. *Cobb:* Good corn season; better yield than last year, but on a reduced average. *Walton:* Heaviest crop for many years. *Clayton:* Upland corn good, bottom corn injured by wet. *Wilkes:* Full average and fine. *Whitfield:* Largest crop for years. *Clay:* Fifteen per cent. above last year, and of better quality. *Liberty:* Short though protracted drought, and injured by a storm; quality better than last year. *Schley:* Shortened by drought, but quality as good as last year.

FLORIDA.—*Leon:* Less in product but better in quality. *Orange:* Shortened by drought one half. *Columbia:* Short but good. *Taylor:* Five per cent. below average in quality.

ALABAMA.—*Morgan:* Crops would have been unparalleled but for a partial flood during the summer. *Colbert:* Crop exceeds last year in spite of storm and drought; this is attributed to early planting and improved cultivation. *Chambers:* Improved in quantity and quality. *Montgomery:* Good crop in quantity and quality. *Macon:* One of the best crops ever raised. *Lawrence:* Good in quantity and quality. *Tuscaloosa:* Good yield and quality. *Randolph:* Better than last year.

MISSISSIPPI.—*Kemper:* Best crop for years. *Jefferson:* Large and superior yield. *Yazoo:* Late planted, but with favorable weather the yield was large. *Rankin:* Nearly every planter has raised corn enough for his own demand. *Tishemingo:* Injured by drought. *Wilkinson:* Full average and in good condition. *Wayne:* Injured by drought.

LOUISIANA.—*Franklin:* Both early and late very good. *Lafourche:* Not so many ears to the stalk, but more grain and less shuck. *Carroll:* Good in quantity and quality.

TEXAS.—*Lampasas:* Full crop. *Austin:* One of the best crops ever raised in the country. *Gonzales:* But little injured by the severe drought. *Fayette:* Exceedingly good in quantity and quality. *Coryell:* Some farms made as high as 65 bushels per acre. *Burnet:* Very abundant; some farms double last year's crop. *Marion:* 10 per cent. above average; acreage about average. *Kaufman:* 200 per cent. of last year's crop and heavier. *Upshur:* Improved in quantity and quality. *Travis:* Never better. *Red River:* Good. *Rusk:* Not so good; ears short and husks long. *Craven:* Good. *Henderson:* Corn abundant; mast light.

ARKANSAS.—*Fulton:* Damaged by squirrels. *Jackson:* Reduced by squirrels and blackbirds. *Arkansas:* Crop made before the drought set in. *Montgomery:* Increased acreage; early planted good; late planted short. *Washington:* Matured before the drought.

TENNESSEE.—*Jackson:* Early plantings good; later ones light. *Blount:* Crops made before the drought. *Gibson:* Early crops good; later ones short. *Rhea:* Well ripened and sound. *Madison:* Quality improved by dry weather. *Dyer:* Unusually large crop;

beyond home demand. *Lincoln:* Heavy and good. *Bradley:* Far superior to last year's crop. *Scriver:* Good in spite of drought. *Greene:* Lighter than last year. *Coffee:* Above average, though shortened by drought. *Hardin:* Early crops gathering better than was expected; late crops lighter. *Monroe:* Good, though somewhat spotted. *Giles:* Mostly gathered in fine condition. *Fentress:* Increase both in acreage and yield; best quality; 40 to 50 cents per bushel. *Wayne:* Early corn better than expected; late crops light.

West Virginia.—*Tyler:* Shortened by drought; quality good. *Jefferson:* Acreage increased 8 per cent. and yield per acre 5 per cent. *Brooke:* Irregular; some fields only a half crop; mostly saved from frost; fodder good. *Braxton:* Good. *Pocahontas:* Ripening finely in good fall weather. *Monongalia:* Got in in good order in the fine weather.

Kentucky.—*Owsley:* Very fine. *Shelby:* Drought cut down late corn very low. *Scott:* Early crop average; late corn but half a crop. *Russell:* Best crop for many years. *McLean:* A most prosperous corn year. *Lincoln:* Crop good and well matured. *Laurel:* Never better. *Hardin:* Large crop; 30 cents per bushel. *Graves:* 20 per cent. above average; good quality. *Anderson:* Below average, light and chaffy.

Ohio.—*Athens:* Large crop. *Darke:* Very heavy and well matured. *Logan:* Very large crop. *Fulton:* Splendid crop. *Warren:* Average; better on uplands than bottoms. *Tuscarawas:* Well matured. *Lorain:* Large yield; well matured. *Ross:* Splendid crop. *Pickaway:* Light but sound. *Morrow:* Largest yield for years; quality good. *Licking:* Largest crop yet raised. *Hancock:* Crop saved by later rains; gathered in good condition. *Franklin:* General crop never so heavy; selling at 25 cents per 70 pounds. *Delaware:* Never better; harvested in good order; brings 30 cents at the railroad. *Crawford:* Good; ripened before frost; probably a larger quantity in the county than at any time in five years. *Coshocton:* Above average in quantity and superior in quality. *Ashland:* Crop large and excellent. *Adams:* Somewhat shortened by drought since August, but well matured by the late season. *Brown:* Escaped frost, but loose on the cob and chaffy.

Michigan.—*Washtenaw:* No. 1 in quantity and quality. *Van Buren:* Seriously affected by drought. *Ottawa:* Shortened by backward spring and subsequent drought. *Oakland:* Crop would have been much larger but for cut-worms. *Mason:* Fine. *Lenawee:* Abundant and good. *Jackson:* Recovered from the cut-worm injuries early in the season; well ripened. *Clinton:* Increased acreage and improved condition. *Mecosta:* Good in spite of drought. *Antrim:* Good crop.

Indiana.—*Noble:* Where not replanted the crop was never better. *Montgomery:* Fine in the ear, but lighter in the grain than last year. *Marion:* Crop large, but lighter in weight than last year. *Madison:* Very fine and abundant. *La Grange:* Decreased by drought. *Hamilton:* Excellent and in good condition. *Decatur:* Corn not well cultivated, on account of wet, in April and May, but the fine weather of June and July secured an average crop in quantity, though 5 per cent. below average in quality. *Steuben:* Below average; many fields destroyed by the grub-worm. *Hancock:* Excellent. *Clay:* Injured by wet July and dry fall. *Morgan:* Yield increased, but quality deteriorated. *Owen:* As good as any former crop, and double of last year; the rains came promptly at each critical time. *Scott:* Shortened 20 per cent. by drought. *Franklin:* A little better than last year, and the best in forty years.

Illinois.—*Whiteside:* Heavy and good. *Winnebago:* Matured in the best possible condition. *Tazewell:* Matured finely before frost. *Saint Clair:* Deteriorated by drought. *Stephenson:* Largest and best crop ever raised. *Putnam:* Somewhat damaged by being blown down. *Ogle:* Very good quality. *Madison:* Prematurely ripened. *Macoupin:* Matured before frost. *Livingston:* Low prices—12 cents—requires four bushels to get one to market. *Iroquois:* Filled on the cob from one end to the other; perfectly matured before frost. *Grundy:* Abundant, with one-fourth of last year's crop on hand; high freights reduce prices. *Douglas:* Gathered in good condition; low prices. *Cook:* Best crop in thirty-five years. *Clinton:* Injured by chinches. *Champaign:* Early-planted corn better than last year; late crops frosted. *Perry:* Reduced by chinches. *Cass:* Full average in spite of lack of cultivation on account of rain at the opening of the season. *Franklin:* Injured by drought and chinch-bugs. *Lee:* Splendid corn season. *Mason:* Good, though damaged by winds. *Fayette:* Good, and well saved. *Clark:* Full average everywhere; especially fine in sand-prairies.

Wisconsin.—*La Fayette:* Propitious corn season. *Saint Croix:* Matured better than usual. *Green Lake:* Fair and well ripened. *Calumet:* Later part of the season especially favorable. *Pierce:* Well ripened. *Outagamie:* Greatly damaged by cut-worms.

Minnesota.—*Steele:* Had a poor start, but recovered and ripened well. *Wright:* Well ripened, but rather small. *Fillmore:* Best crop yet grown. *Redwood:* Much corn replanted; injured by blackbirds.

Iowa.—*Tama:* Bottom corn injured by high water in June. *Muscatine:* Average quality. *Monona:* Injured by storm July 19. *Marion:* Injured in some localities by chinches. *Lee:* Matured well on upland and dry soils. *Jackson:* Ripened too

rapidly; loose on the cob. *Howard:* Good. *Clinton:* Great crop. *Benton:* Last year's crop one of the best ever raised; this year's, 30 per cent. better.

MISSOURI.—*Scott:* Early corn, average; late, nearly a failure. *Platte:* Finest crop in ten years. *Phelps:* Injured by chinches. *Newton:* Less than last year, but sound and good. *Mercer:* Superior to all crops raised during late years. *Linn:* Largest and best crop ever raised; sells at 15 to 20 cents per bushel. *Lincoln:* Crop well saved. *Holt:* Extraordinary crop, even for this region. *Harrison:* Well matured; better in quality than last year, but shorter. *Greene:* Crop very large, but grain somewhat light. *Chariton:* Fine corn season. *Cass:* Good in quantity and quality. *Caldwell:* Splendid crop where well tilled. *Cape Girardeau:* Not uniformly good, but a general average. *Clay:* Good condition. *Ralls:* Excellent and more abundant than for five years past. *Saint Clair:* Very light, owing to late planting and dry fall. *Pemiscot:* Did not fill out well. *Franklin:* Good quality. *Lane:* Larger than for ten years. *Maries:* Injured by chinches.

KANSAS.—*Woodson:* Unprecedented crop. *Washington:* All crops good. *Riley:* Largest and best crop yet raised. *Nemaha:* Heavy and dull, sale at 15 cents per bushel. *Lyon:* Magnificent crops. *Labette:* Sod crops—one-fourth the whole—below last year's yield. *Jefferson:* Late planted on account of wet, but redeemed by the fine weather of September and October; cribbed in excellent order. *Crawford:* Late corn failed to mature well; earlier crops good. *Cloud:* Light and shrunken on the cob. *Douglas:* One of the heaviest crops ever produced in Kansas; price 20 cents per bushel. *Linn:* Very large crop. *Republic:* Corn plenty; late planted generally worm-eaten. *Coffey:* Large and sound crop, but portions of it poorly cultivated on account of rain. *Miami:* In bad condition for gathering, having been twisted by a hurricane in September.

NEBRASKA.—*Thayer:* Crop would have been extra but for grasshoppers. *Nemaha:* Corn harvest weather fine. *Washington:* Superior to any former crop both in quantity and quality. *Cass:* Well matured.

CALIFORNIA.—*San Bernardino:* Abundant and cheap; $1 per cental sacked; no demand. *Amador:* Satisfactory in quality and quantity. *Contra Costa:* Quality excellent. *Sacramento:* Blighted by northwest winds early in the season, hence the crop is short.

OREGON.—*Linn:* Average quality. *Douglas:* Turns out better than was expected; stood the drought better than any other crop. *Clackamas:* Frequent showers brought out the crop finely.

UTAH.—*Box Elder:* Good except where injured by frost. *Cache:* Injured by late frost. *San Pete:* Too cold for corn this year; many farmers feeding their crop as fodder without husking.

COLORADO.—*Larimer:* Injured by early frost.

DAKOTA.—*Clay:* Damaged by grasshoppers. *Bonhomme:* Injured by grasshoppers. *Minnehaha:* Well matured.

ARIZONA.—*Yuma:* Increased culture; crops averaging 50 bushels per acre are reported.

WASHINGTON.—*Thurston:* Only used in the green state for roasting. King Philip will ripen in favorable localities. Minnesota sweet has been introduced and sells for half a dollar per ear.

COTTON.

The present may be classed with the unpropitious seasons for cotton production, but it is not a more unfavorable year than the preceding one. It has been productive of somewhat less than average results, not from a failure of the "stand" of plants, nor from excessive cold and moisture in the spring so repressive of growth in cotton and preventive of clean culture, but from the wider prevalence of insect depredations, and from local droughts of more or less severity. The plant has been earlier in maturing than usual, and quicker to decay, leaving less for destruction by frosts, which have somewhat anticipated their average date of appearing. In the Carolinas and Georgia, fertilizers have aided in advancing the period of maturation. Returns since November have not advanced the crop prospects of the season, but are not of such a character as to change materially the estimate derived from the November returns.

The November digest of tabular and other returns, the substance of which was telegraphed to the press last month, is as follows:

The weather has been fine for picking. Frosts have been earlier than usual in the more northern States; but an earlier maturity of the plant

is indicated everywhere, and the past month has been quite favorable for the development of the maturing bolls, while the returns of the condition since August have been much below the average. They have been higher than those of the corresponding months of the previous and very unfavorable season, averaging in October, 82 against 76, and in September, 91 against 81. The November returns give the indicated total product in comparison with the small crop of 1871, and the average made is about 16 per cent. increase, with an area in cultivation larger by 12 to 13 per cent. The greatest losses from the prevalence of the army and boll worm are found in Florida and Alabama. In Louisiana, Mississippi, and Georgia local damage has been heavy. In Arkansas a material reduction of the yield was caused by drought in July and August. The comparison by States with last year's crop is as follows: North Carolina, 121; South Carolina, 124; Georgia, 119; Florida, 102; Alabama, 111; Mississippi, 112; Louisiana, 121; Texas, 126; Arkansas, 115; Tennessee, 110. Missouri, Virginia, Illinois, and other States which together produced 55,000 bales in 1860, and in which cotton culture was stimulated in several subsequent years, now scarcely yield 10 per cent. of that amount.

The total production, as indicated by the returns of the first week in November, is made very nearly 3,450,000 commercial bales. At that date, apparently 25 to 30 per cent. of the crop, or nearly 1,000,000 bales, remained to be picked, and subject to the vicissitudes of the weather, which might decrease the annual aggregate by beating storms, or slightly enlarge it by a favorable season for opening and gathering the fiber of the top crop. The indicated product of fiber per acre returned from each county makes the following averages for each State, viz: North Carolina, 173 pounds; South Carolina, 182; Georgia, 180; Florida, 125; Alabama, 170; Mississippi, 200; Louisiana, 215; Texas, 220; Arkansas, 170; Tennessee, 190. The area of cotton, as calculated from the returns of 1872, is as follows: In North Carolina, 450,629; South Carolina, 570,652; Georgia, 1,311,331; Florida, 158,099; Alabama, 1,387,972; Mississippi, 1,537,618; Louisiana, 940,218; Texas, 914,269; Arkansas, 693,515; Tennessee, 518,605. In calculating the indicated product, the average bale is estimated at 465 pounds.

On the basis of former estimates of acreage, and the November returns of production, the indicated yield per acre and product in pounds (which should be received as an unbiased rendering of returns of correspondents at that date, rather than an authoritative prediction of what the crop, when fully gathered, will prove to be) is as follows:

States.	Number of acres.	Yield per acre.	Number of pounds of fiber.	Number of commercial bales.
		Pounds.		
North Carolina	450, 629	173	77, 958, 817	167, 653
South Carolina	570, 652	182	103, 858, 664	223, 351
Georgia	1, 311, 331	180	236, 039, 580	507, 612
Florida	158, 099	125	19, 762, 375	42, 499
Alabama	1, 387, 972	170	235, 955, 240	507, 430
Mississippi	1, 537, 618	200	307, 523, 600	661, 341
Louisiana	940, 218	215	202, 146, 870	434, 724
Texas	914, 269	220	201, 139, 180	432, 557
Arkansas	693, 512	170	117, 897, 040	253, 542
Tennessee	518, 605	190	98, 534, 950	211, 903
Total	8, 482, 905	188. 7	1, 600, 816, 316	3, 442, 612

The yield per acre is based upon the aggregate gross weight in

pounds of the total number of bales of cotton produced in each county, divided by the number of acres cultivated, and includes all for which the grower was paid—cotton, bagging and ties.

The following extracts from correspondence will illustrate local conditions of this crop:

VIRGINIA.—*Prince George:* Cotton largely substituted for pea-nuts; has not answered expectations. *Southampton:* Shortened by drought, but fine; 11,750 pounds seed-cotton yielded 3,993 of lint.

NORTH CAROLINA.—*Chowan:* Reduced by drought and rust beyond all expectation. *Bladen:* Yield below last year, but increased acreage may bring up the aggregate. *Currituck:* Slightly damaged by rust. *Pasquotank:* Yield one-third short. *Greene:* Crop shortened by several causes; many top-bolls did not open. *Marlborough:* Yield after all deductions about equal to last year, with 10 per cent. more acreage; killing frost October 12 and 13, a month earlier than last year. *Gaston:* Our high hopes fully realized. *Mecklenburgh:* Better than expected, though early frost was injurious. *Moore:* Four-fifths picked and one-half marketed; fine picking season. *Cumberland:* Acreage and yield increased 5 per cent. each; scarcity of hands; frost and rains render much of the later crop yellow or stained. *Franklin:* Not so good as was expected, but increased acreage will probably bring up the aggregate of last year. *Sampson:* Much cotton unpicked for lack of hands. *Perquimans:* Acreage double, making the product 40 per cent. greater than last year. Cotton gathered before late rains yielded 175 pounds per acre; that gathered since only 125 pounds. *Wake:* Crop better than was expected though late bolls dried up. *Stanley:* Short over one-fifth; plants were loaded with green bolls October 15, and utterly destroyed by frost. *Edgecombe:* Acreage 20 per cent. short and quality reduced 5 per cent., but it is thought the actual yield will be equal to last year. Caterpillars appeared in several places August 18, and did much damage. *Onslow:* Late plantings cut down one-half. *Alexander:* Acreage small but increased; greater average yield per acre.

SOUTH CAROLINA.—*Clarendon:* Nearly all gathered in good order; about one-fourth still standing, which will be injured by the rain now falling. *Greenville:* Planters expected 25 cents a pound, but got only 14 to 16 cents; many badly in debt for provisions, &c. *Fairfield:* Prospect greatly declined since August; heat and drought, with cold nights, cut short the late bolls except on moist lands, and these were taken by a heavy frost October 14. Still the aggregate yield will be above that of 1871. *Chester:* A third of the crop still ungathered and wasting. *Lexington:* Crop matured earlier than ever before, and has been more closely picked; quality fine, gathered before frost; nearly all ready for market. *Newberry:* Fine weather for picking, which is much earlier than usual, securing a finer quality of cotton. *Barnwell:* Late crops frosted. *Orangeburgh:* Nearly all gathered, cut short by worms and early frost. *Richland:* Better than last year.

GEORGIA.—*Dooly:* Shortened by drought. *Muscogee:* Shortened by rust, extremes of drought and wet, and caterpillars; in many places very poor. *McDuffie:* Good picking season. *Oglethorpe:* Crop opened and gathered with unexampled rapidity, owing, probably, to dry fall and copious use of fertilizers. *Cobb:* Season good and crop 50 per cent. above average. *Lee:* Last picking unexpectedly poor: crop will make a bale to seven acres. *Walton:* Above average; best since 1860. *Brooks:* Nearly gathered; best crop for years. *Greene:* Large number of bolls frost-killed. *Macon:* Below average. *Twiggs:* Crop will average probably 112 pounds lint per acre. *Clayton:* Seriously injured by early frost. *Chattooga:* Unmatured bolls injured by frost in October. *Wilkes:* Has done much better than was expected; fine picking weather. *Putnam:* Better than last reported; caterpillars too late to do much damage. *Fayette:* Materially injured by frost October 15; four-fifths gathered. *Clay:* Better than last report. *Liberty:* Injured by caterpillars; good weather for picking. *Pike:* Drought in May prevented cotton from coming up in time to escape frost. *Newton:* Frost disastrous to cotton, especially to late plantings on bottom-lands. *Whitfield:* Yield and quality good.

FLORIDA.—*Columbia:* Sea-island cotton injured 20 per cent. by drought and caterpillars. *Gadsden:* Half an average. *Suwannee:* Cotton all in on account of caterpillars.

ALABAMA.—*Walker:* Crop would have exceeded that of last year but for the cotton caterpillar, which cut it off one-third; average increased. *Colbert:* Crop will exceed last year's in spite of drought and army-worm, but the quality will be depreciated; picking slow; much will be left in the field; better cultivation than formerly. *Chambers:* Would have exceeded last year's crop but for caterpillars and early frost, October 14; yield equal to last year. *Montgomery:* Full average; 10 per cent. better than last year; market quality of crop above average; 150 pounds lint per acre. *Crenshaw:* Cut off by worm, rust, and drought; gathered a month or six weeks early. *Macon:* Planters disappointed by the yield; fine picking season. *Lawrence:* Probably above average; quality excellent; good picking season. *Tuscaloosa:* Poor crop; drought

prematurely opened the bolls left by the caterpillar. *Randolph:* Half crop; better where guano was used.

MISSISSIPPI.—*Yazoo:* Yield probably equal to last year. *Jasper:* Spring drought injured crops on black land. *Warren:* Prospects of the crop improved by fine picking season. *Grenada:* The crop not much injured by the severe drought. *Rankin:* Good season; crop from 100 to 400 pounds per acre. *Tishemingo:* Fine picking season enhanced the yield. *De Soto:* Better than was expected. *Yalabusha:* Fine weather maturing all the bolls. *Coahoma:* Suffered from spring rain, summer drought, and slovenly cultivation; matures six weeks earlier than usual, and too rapidly to be well gathered. *Hinds:* Dry fall enhanced the yield. *Wayne:* Cut short by drought, boll-worm, and caterpillar. *Kemper:* Shortened by drought and caterpillars. *Winston:* Early bottom crops good, but late plantings and upland plantings poor. *Holmes:* Fine picking season; crop short, but yields lint in large proportion and of superior quality. *Jefferson:* Yield larger than last year.

LOUISIANA.—*Tangipahoa:* Short crop. *Madison:* Damaged by worms and drought; fine picking weather increased the yield 10 per cent. *Franklin:* Shortened by drought and caterpillars, but better than was anticipated; average yield, 200 pounds of lint per acre. *East Baton Rouge:* The most favorable picking season ever known, bringing the yield up to last year's. *Morehouse:* Fine weather improved the crop 25 per cent. *Carroll:* Prospect improved; but little will be lost. *Claiborne:* Three-fourths of a crop well housed.

TEXAS.—*Henderson:* Nearly all gathered. *Craven:* Three-fourths average; shortened by frost. *Rusk:* Mostly gathered; yield 70 pounds lint on uplands, and 120 on bottoms. *Red River:* Lint heavy in prairie and bottom crops; light on sandy soils, reducing the average; yield good. *Upshur:* Larger proportion of lint; crop one-fourth less than last year. *Kaufman:* Better than was expected; most upland classed as good ordinary; yield per acre less than last year, but the acreage is nearly double. *Marion:* Less than half a crop; averages 100 pounds lint per acre. *Dallas:* Quality unusually fine. *Burnet:* Shortened one-half by drought. *Fayette:* All the river-lands well cultivated and early sown with the "Early Prolific" cotton-seed averaged 500 pounds lint per acre; uplands average about 300. *Gonzales:* Drought arrested the ravages of the worm, and the fine open fall enabled farmers to gather the whole crop; some made a bale per acre; whole crop averages half a bale. *Bosque:* Drought shortened the crop from 500 to 300 pounds per acre. *Austin:* Yield better than was expected. *Burleson:* Unusual proportion of lint—about a third of the whole; free from dirt and trash.

ARKANSAS.—*Fulton:* Injured by drought. *Craighead:* Marketed earlier than last year. *Pulaski:* Improved a little. *Jackson:* Shortened by drought in July and August. *Bradley:* Injured by drought. *Monroe:* Damaged by drought more seriously than was supposed. *Montgomery:* Shortened by drought.

TENNESSEE.—*Gibson:* Acreage increased; yield shortened by drought. *Madison:* A bale to 4 acres. *Dyer:* Acreage increased, but yield per acre diminished. *Lincoln:* Yield average; quality excellent. *Hardin:* Better quality than was expected. *Giles:* Yield better than was expected; many crops range from 1,000 to 1,500 pounds seed-cotton per acre.

KENTUCKY.—*Russell:* Small patch produced 600 pounds per acre.

POTATOES.

The returns of correspondents point to a decrease of 5 per cent. from the product of last year, amounting to about six millions of bushels. The Western States, in which this crop has suffered for several years from the ravages of the Colorado beetle, report diminishing losses from this cause, and are the only States, North Carolina and Texas excepted, reporting increased production. The averages are as follows: Maine, 65; New Hampshire, 80; Vermont, 86; Massachusetts, 90; Rhode Island, 92; Connecticut, 94; New York, 90; New Jersey, 75; Pennsylvania, 95; Delaware, 75; Maryland, 75; Virginia, 92; North Carolina, 104; South Carolina, 87; Georgia, 89; Florida, 74; Alabama, 94; Mississippi, 94; Louisiana, 85; Texas, 123; Arkansas, 93; Tennessee, 100; West Virginia, 85; Kentucky, 101; Ohio, 90; Michigan, 101; Indiana, 115; Illinois, 135; Wisconsin, 95; Minnesota, 127; Iowa, 109; Missouri, 93; Kansas, 110; Nebraska, 104; California, 109; Oregon, 124.

MAINE.—*York:* Potatoes injured in quantity and quality by excessive moisture, but no rot. *Sagadahoc:* Considerable rot. *Cumberland:* Rotted both before and after digging; price from 50 cents to $1. *Waldo:* Heat and moisture reduce the quantity of

sound potatoes to about one-half of last year. *Somerset:* Half a crop and poor *Aroostook:* Lighter and poorer than common; many rotten tubers.

NEW HAMPSHIRE.—*Hillsborough:* Early planting of good quality, but considerable rot on low-lands. *Stafford:* Reduced in quantity by rust and wet. *Coos:* Light and poor crop.

VERMONT.—*Franklin:* Rotted badly on some soils; acreage and yield both reduced. *Orange:* Early plantings best, but the rot almost universal; not so destructive as in 1846; increased acreage. *Orleans:* Below average and considerably rotted.

MASSACHUSETTS.—*Worcester:* Rotten. *Norfolk:* Crop average in quantity, but depreciated by wet weather. *Berkshire:* Suffered from dry weather in June, rot in September, especially in highly manured soils; Early Rose and Peerless suffered most; other varieties not very greatly injured. *Hampden:* Very much injured by rain.

RHODE ISLAND.—*Washington:* Reduced 10 per cent. in quantity by summer drought; depreciated in quality.

CONNECTICUT.—*New London:* Crop better than last year, though injured by the white and wire worms. *Hartford:* Excessive top-growth impoverished the tubers. *Litchfield:* Not so good as last year.

NEW YORK.—*Rockland:* Below average, but of excellent quality. *Ontario:* Great crop. *Chatauqua:* Below average, but sound and free from rot; 50 cents per bushel. *Erie:* Acreage increased, but yield disappointing diggers; Colorado beetle appeared October 20, eating small potatoes left in the hills. *Warren:* Small crop; injured by white grub; poor in quality. *Genesee:* Quality excellent. *Steuben:* Above the average of several years. *Albany:* Not much over a half crop. *Chemung:* Smaller than usual, owing to late rains. *Columbia:* Poor; badly rotted and worm-eaten. *Seneca:* Late varieties rotted by heavy rains during the digging-season. *Delaware:* Run to vines with few tubers. *Onandaga:* Yield fine, but considerable rot.

NEW JERSEY.—*Warren:* Crop short; quality average. *Burlington:* Poorer in quantity and quality than for several years. *Hudson:* Injured by drought, especially late varieties; Peachblows most injured; Early Rose did well.

PENNSYLVANIA.—*Elk:* Crop poorer than was anticipated; Early Rose and Peerless rotted badly on low lands. *Juniata:* Injured by rain; rotted to some extent. *Wayne:* Rain delayed potato-digging. *Armstrong:* Crop largly run to top, but turns out more tubers than last year, though not so dry or sound. *Crawford:* Not a full crop. *Lancaster:* Three-fourths of a crop and poor. *Lawrence:* The tubers injured by second growth, making them soggy; sweet potatoes better than usual.

DELAWARE.—*Sussex:* Greatly benefited by late rains.

MARYLAND.—*Baltimore:* Much reduced by drought; early planted good; late planted a failure. *Caroline:* Small crop; sweet potatoes good.

VIRGINIA.—*Orange:* Root crops fair; sweet potatoes improved by September rains. *Fluvanna:* Late crops short. *Middlesex:* Late crops suffered from drought; sweet potatoes abundant and fine. *Nelson:* Shortened by drought, but fair compared with last year. *Stafford:* Severely injured by draught. *Madison:* Shortened by drought and bugs; sweet potatoes very fine. *Highland:* Remarkably fine. *King and Queen:* Deficient yield. *Cumberland:* A complete failure. *Prince George:* Almost a failure. *Fauquier:* A failure; sweet potatoes fine. *Fairfax:* Very fine; especially Peach-blows. *Henrico:* Early planted short nearly a half; sweet potatoes very fine. *Gloucester:* A failure; sweet potatoes short. *Southampton:* Suffered from drought, but of excellent quality.

NORTH CAROLINA.—*Bladen:* Sweet potatoes short but good. *Greene:* Sweet potatoes almost a failure; too much rain in the spring, and too dry in summer and fall. *Gaston:* Sweet potatoes abundant and fine. *Mecklenburgh:* Potato crop short. *Alamance:* Both kinds very fine. *Iredell:* Sweet potatoes excellent. *Stanley:* Late crops suffered from drought. *Onslow:* Very poor; not over a half-crop.

SOUTH CAROLINA.—*Clarendon:* Injured by drought. *Orangeburgh:* Shortened by drought. *Newberry:* Almost a failure.

GEORGIA.—*Worth:* Injured by drought. *Dooly:* Short. *Muscogee:* Inferior. *McDuffie:* Best crop for years. *Lee:* Injured by drought and frost. *Marion:* Sweet potatoes cut off by late drought. *Hancock:* Sweet potatoes a complete failure from drought. *Wilkes:* Sweet potatoes greatly injured by drought. *Whitfield:* Cut off by drought. *Decatur:* Short and poor. *Liberty:* Diseased by drought. *Schley:* Sweet potatoes 50 per cent. short.

FLORIDA.—*Taylor:* Twenty per cent. above average. *Columbia:* Sweet potatoes shortened by drought. *Leon:* Injured by drought in September and October.

ALABAMA.—*Walker:* Sweet potatoes not so good as last year. *Colbert:* Potatoes average; sweet potatoes failed for lack of rain at the right time. *Montgomery:* Short but good. *Tuscaloosa:* Sweet potatoes unusually poor, both in yield and quality. *Calhoun:* Injured by drought. *Randolph:* Good yield in spite of drought, and good quality.

MISSISSIPPI.—*Tishemingo:* Sweet potatoes small and scarce. *Williamson:* Shortened

by drought, but good. *Wayne:* Sweet potatoes injured by drought. *Kemper:* Sweet-potato crop light. *Jefferson:* Crop small, but good.

LOUISIANA.—*Tangipahoa:* Sweet potatoes shortened by drought. *Franklin:* Both kinds cut short two-thirds by drought. *Lafourche:* Sweet potatoes promise finely; acreage comparatively small. *Carroll:* Short but good.

TEXAS.—*Ellis:* No crop made; not 100 bushels in the county. *Austin:* Good sweet potatoes; half a crop. *Coryell:* Entire failure. *Marion:* Sweet potatoes a complete failure. *Kaufman:* Almost a failure. *Colton:* Deficiency of sweet potatoes, due to scarcity of seed in the spring. *Travis:* Almost a failure. *Rusk:* Cut short by drought. *Craven:* Sweet potatoes fallen to a good average.

ARKANSAS.—*Fulton:* Sweet potatoes injured by drought. *Crittenden:* Sweet potatoes injured by drought. *Bradley:* Injured by drought. *Washington:* Sweet potatoes injured by drought.

TENNESSEE.—*Jackson:* Both kinds damaged by drought. *Blount:* Injured by drought. *Gibson:* Better than for many years; sweet potatoes light. *Rhea:* Not so good. *Lincoln:* Both kinds poor. *Bradley:* Late crops a failure; sweet potatoes fair. *Bedford:* Short and not so good. *Monroe:* Both kinds reduced by drought.

WEST VIRGINIA.—*Tyler:* A great failure, both in product and quality. *Jefferson:* Both kinds greatly improved by a favorable late season and the delay of frost. *Doddridge:* Injured by drought. *Brooke:* Not over a half crop; price $1 per bushel. *Braxton:* Good in quality and quantity. *Pocahontas:* Large and good crop.

KENTUCKY.—*McLean:* Early potatoes good; late are short; sweet potatoes, average. *Livingston:* Not one-half a stand. *Lewis:* Late crop short and indifferent. *Graves:* Damaged by drought. *Anderson:* Affected by drought to some extent.

OHIO.—*Athens:* Crop nearly destroyed by drought and Colorado beetles. *Darke:* Average with last year; sweet potatoes not so good as usual. *Logan:* Increased acreage and product. *Fulton:* Good crop. *Tuscarawas:* Late crop injured by Colorado beetles; early crop fair. *Lucas:* Some fields injured by blight taking the vines and stopping the growth of the tubers. *Pickaway:* Injured by drought. *Morrow:* Tolerable; some second-growth; bring 50 cents per bushel. *Morgan:* Badly injured by potato-bugs. *Meigs:* Below average; Colorado beetles. *Licking:* Late potatoes light. *Hancock:* Average, but some second-growth. *Delaware:* Yield enormous, but quality not first rate. *Crawford:* Average; sweet potatoes but little cultivated. *Coshocton:* Early planted, average; later ones injured by bugs. *Butler:* Acreage and aggregate yield reduced. *Ashland:* Materially shortened by bugs; but 10 per cent. above last year. *Brown:* Generally good.

MICHIGAN.—*Washtenaw:* Some fields destroyed by Colorado beetles; sweet potatoes unusually abundant and fine. *Van Buren:* Affected by drought. *Ottawa:* Crop injured by early drought and by excess of rain in September. *Lenawee:* Light and poor through drought. *Jackson:* Crop good till September 1, when the Colorado beetle becomes very troublesome. *Clinton:* Injured by Colorado potato-beetles. *Antrim:* Injured by a long, black bug, and by the Colorado bug. *Van Buren:* Mostly small.

INDIANA.—*Perry:* One-third of a crop. *Noble:* Late crop good. *Marion:* Suffered from drought early in the season; Colorado beetle destructive of late crops. *Madison:* Good; sweet potatoes deficient through drought. *Lagrange:* Late potatoes have grown since August 20, the rains then enabling them to get ahead of the potato-bugs; they have, in consequence of the delay, not well ripened. *Gibson:* Early Rose very good; Colorado bugs less numerous than last year. *Decatur:* Imperfectly cultivated; bugs trimmed the vines, but seasonable rains kept them growing. *Steuben:* Improved crop of potatoes in consequence of decrease of Colorado beetles. *Clay:* Injured by wet July and dry fall. *Scott:* Early potatoes good; later crops damaged by drought. *Franklin:* Sound; no rot, and but slightly injured by Colorado bugs; 45 to 60 cents per bushel.

ILLINOIS.—Early planted did well; late crops mostly destroyed by bugs. *Whiteside:* Extra heavy yield and good condition, 25 cents per bushel. *Winnebago:* Potato-bugs gradually disappeared, leaving the crop to mature well. *Tazewell:* Good yield and quality. *Saint Clair:* Unusually abundant and good. *Stephenson:* Excellent. *Putnam:* Seasonable rains enabled potatoes to survive the ravages of the bugs after their disappearance. *Pulaski:* Average cut down by frost. *Pope:* Shortened by drought and frost. *Ogle:* Improved both in quantity and quality. *Knox:* Sweet potatoes have had an unparalleled season of growth; they seem like the product of the Carolinas. *Cook:* All the potatoes saved from the bug are saved at great cost. *Bureau:* Finest crop for many years. *Cass:* Good season; bugs disappeared. *Franklin:* Late crops destroyed by drought. *Lee:* Good potato-season. *Mason:* Good in quantity and quality. *Fayette:* Both kinds abundant. *Clark:* Good potato-season and no bugs.

WISCONSIN.—*La Fayette:* Fine potato-season. *Fon du Lac:* Light crop, through drought. *Saint Croix:* Rot in some places; good in all wet lands. *Pierce:* Some rot. *Outagamie:* Injured by bugs more than was supposed.

KANSAS.—*Woodson:* Unprecedented crop and consequent low prices. *Washington:* Plenty and good. *Lyon:* Both sorts would have been excellent if the frost had

delayed two weeks. *Jefferson:* Crop not so large as was expected, but of very fine quality. *Crawford:* Potatoes fine. *Osage:* Very large potatoes and of excellent quality. *Republic:* Damaged by bugs; sweet potatoes good. *Coffee:* Good and well saved. *Miami:* Stored in good order.

MINNESOTA.—*Steele:* The great enemy of the potato has left us; crop an old-fashioned big one. *Wright:* Too heavy to pay for digging.

IOWA.—*Tama:* Tendency to rot. *Muscatine:* Fine crop but low prices—15 to 20 cents per bushel; sweet potatoes becoming an important crop. *Marion:* Abundant, but inferior in quality. *Lucas:* Shortened by warm dry weather. *Lee:* Late crops short through drought. *Hardin:* Seriously cut down by Colorado beetles for seven years, but this year they escaped. Tycks seedling bug-proof.

MISSOURI.—*Schuyler:* Superior. *Phelps:* Early crop good; late shortened by drought. *Linn:* Crop large and fine, but no market. *Greene:* Late crop inferior; hot weather of August killed the vines. *Chariton:* Cut-worms swept sweet-potatoes; nearly all the first planting destroyed. *Cass:* Good; late crops short but early ones plentiful. *Caldwell:* Excellent and well saved. *Cape Girardeau:* Early potatoes good; late a failure. *Franklin:* Early Rose and Goodrich of good quality; late potatoes small. *Lane:* Sweet potatoes a poor crop.

NEBRASKA.—*Thayer:* Entirely destroyed by blister-fly or potato-bug. *Nemaha:* Shortened by drought in the latter part of the season. *Washington:* Superior yield and quality. *Cass:* Good, though shortened by the beetle.

CALIFORNIA.—*San Bernardino:* Good, and bring fair prices. *Sonoma:* Fully equal to any previous crop; ninety cents per bushel; sweet potatoes very abundant and cheap; forty-five cents per bushel; but when cooked are watery and deficient in sweetness. *Plumas:* Excellent.

OREGON.—*Linn:* Enlarged and improved crop. *Grant:* Unusually fine; best varieties Early Rose, Goodrich, and Snowball. *Douglas:* Inferior in quality. *Clatsop:* More or less affected with rot. *Clackamas:* Frequent rains have brought out the crop very finely. *Columbia:* Potato-rot general, affecting 10 per cent. of the crop; it is feared that the sound potatoes will rot after digging.

UTAH.—*Morgan:* Large crop; forty cents per bushel. *Kane:* Crop injured, by rains breaking the irrigating-ditches.

COLORADO.—*Laramie:* Unaccountably poor.

DAKOTA.—*Bonhomme:* Crop large and fine.

HAY.

A small increase is indicated over the crop of last year. The abundant rains of June and July, in New England, assured a large crop, which was of good quality, except when injured in making by wet weather. An increased yield was obtained in New York and Pennsylvania, in the Middle States, in South Carolina, Texas, and Arkansas, in the South, and in all the Western States except Ohio. The aggregate of the crop will probably be about 24,000,000 tons.

WINTER-GRAIN.

From notes of correspondence on the seeding and early growth of winter-grain, it appears that drought has somewhat retarded seeding in the South and West; that the seed is slow in starting, generally small in size, yet healthy in appearance. West of the Missouri, where winter-wheat is planted, the young crop is more promising than in States east of the Missouri. In all parts of the country, however, where the soil is kept in good tilth, the plant is flourishing. In the compacted, undrained soils, where drought is so injurious at seeding-time, we shall hear in the spring of "freezing out" and a sickly growth of that which retains any vitality. So far there is nothing to indicate anything materially better or worse than an average condition of the crop in autumn, the usual local complaints of drought, fly, and chinch-bug prevailing, as seen in the following desultory extracts:

PENNSYLVANIA.—*Cumberland:* More promising than for many years. *Lancaster:* Wheat lately sown is declining in condition under the influence of the weather; pros-

pect poor. *Cambria:* Growing crops protected by a fine snow. *Berks:* Horse-disease interfered with plowing and seeding. *York:* Growing crops look remarkably well.

NEW YORK.—*Chemung:* Wheat sown late through scarcity of labor; hence not up to an average. Rye, small crop, planted early, looks well. *Otsego:* Wheat looks well. *Genesee:* Wheat looks well. *Wyoming:* Wheat looks well, but the acreage has been reduced.

MARYLAND.—*Baltimore:* Young wheat growing luxuriantly: autumn favorable; ground well prepared; fertilizers freely used: large acreage of rye, which looks well. *Caroline:* Wheat growth slow and poor; "Ushak Russian Bearded White," two years from the Department, the best variety.

VIRGINIA.—*Warwick:* Newly sown-wheat looks well; has had favorable weather. *Pulaski:* Wheat looks poor; part did not come up well; crippled by drought. *Amelia:* Lack of labor narrowed the area sown. *Frederick:* Early-sown wheat injured by the fly. *Shenandoah:* Early-sown wheat made a fine start, but in many fields was destroyed by the fly; preparation of soil good, but much of the grain put in too late and the season too dry. *Prince George's:* Late fall has brought the wheat to a full average though some of the late seeded looks badly. *Page:* Wheat looks better than last year; more lime and manure used, and less of phosphates; better cultivation; wheat sown before the 15th September has the fly to some extent, but not seriously. *James City:* Wheat early sown and looks finely. *King George:* Wheat looks as well as usual; heavy rains early in November. *Louisa:* Wheat sown late; weather not favorable; hence it does not look so well as usual. *Essex:* Wheat injured by sharp cold weather with high winds.

NORTH CAROLINA.—*Mecklenburgh:* Fine seeding season. *McDowell:* Fine seeding season; twice as much wheat sown as last season. *Moore:* Fall seeding later than usual on account of dry weather. *Clarke:* Early-sown wheat considerably injured by the Hessian fly; wheat not so affected looks well. *Perquimans:* Wheat-culture going backward. *Yadkin:* Early-sown wheat looks well.

SOUTH CAROLINA.—*Greenville:* Wheat sown as late as November 20. *Lexington:* Wheat not all sown, and little of that sown has come up; weather very cold and unfavorable to early growth. *Chesterfield:* Seeding backward.

GEORGIA.—*Forsyth:* Wheat-seeding late. *Cobb:* Wheat generally sown on cotton-land, and hence not yet out of the ground.

FLORIDA.—*Gadsden:* Increased area in oats, with improved preparation of soil.

ALABAMA.—*Colbert:* Much wheat will yet be sown, but the acreage will fall short of last year.

MISSISSIPPI.—*Jasper:* The small amount of winter-grain sown (chiefly oats) was slow in coming up.

TEXAS.—*Dallas:* Rains, early in November, greatly improved the new-sown wheat. *Williamson:* Average of winter-grain restricted by drought. *Bosque:* Wheat coming up badly through the dry and cloddy ground in spite of extra pains in putting in the crop. *Blanco:* Sowing of grain restricted on account of the presence of immense swarms of grasshoppers.

ARKANSAS.—*Fulton:* Wheat late sown; drought restrained its germination.

TENNESSEE.—*Putnam:* Wheat sown late on account of dry weather; but little of it up yet. *Smith:* Wheat-sowing tedious; early sown looks well. *Loudon:* Long fall drought delayed wheat-sowing and cold weather has kept it from coming up. *Greene:* Winter-wheat small, but of good color. *Hancock:* Wheat but little affected by the severe cold. *Calhoun:* Wheat put in better than usual. *Lincoln:* Wheat unusually small owing to the dry fall and cold November. *Robertson:* Wheat-growth retarded by drought.

WEST VIRGINIA.—*Jefferson:* Wheat acreage increased and sown earlier, with better preparation of soil; fly injurious until checked by frost October 20; four weeks of warm rains, followed by pleasant weather, have nearly cleaned out the insect. *Berkeley:* Some complaint of fly in wheat, but damage not serious.

KENTUCKY.—*Butler:* Wheat injured by drought. *Fayette:* Weather hard on small grain. *Graves:* Wheat and rye slow in coming up, drought damaging them. *Laurel:* Wheat-seeding unusually late, drought having delayed plowing. *Nicholas:* Drought has injured the newly-sown wheat, which is coming up badly; springs and wells failing; some very cold weather in November. *Lincoln:* Wheat and rye injured by dry, cold weather. *McLean:* Wheat injured by drought and cold. *Mercer:* Fall grain injured by drought and cold; seeding late. *Ohio:* Dry weather unfavorable to wheat.

OHIO.—*Miami:* Wheat looks bad for lack of rain; some fields hurt by fly. *Adams:* Growing crop thicker and stronger through fine growing weather; ground covered with snow. *Mercer:* Wheat suffering from some unknown insect. *Vinton:* Wheat and rye sown in good season, but the ground too dry for its rapid vegetation; much of it did not come up; that which came up early was injured badly by the fly. *Putnam:* Growing wheat looks poor; some fields half destroyed by the wire-worm. *Coshocton:* Acreage of wheat reduced by lack of good seed, but the prospects of the crops and character of cultivation in advance of last year. *Marion:* Winter-sown looks well.

Crawford: Wheat and rye generally look well. *Fairfield:* Wheat came up irregularly owing to drought, which also prevented many fields from being seeded. *Shelby:* Wheat has suffered much from drought in November.

MICHIGAN.—*Livingston:* Low condition of wheat is due to extreme drought; the ground has never been so thoroughly dry; has not been thoroughly wet for two years. *Montcalm:* Wheat looks well. *Washtenaw:* Winter-grain looks well.

INDIANA.—*Decatur:* Wheat looks well; acreage probably above the average. *Perry:* Very dry and unusually cold for November, injuring the wheat. *Owen:* Winter-wheat needs rain badly. *Brown:* Sowed rather late, but looks reasonably well. *Morgan:* Wheat looks well; increased acreage. *Miami:* Wheat looked bad even when early winter set in; Wabash frozen over and crossed by teams; but little snow yet. *Boone:* Wheat supposed to be injured by insects and drought. *Hamilton:* Small through drought; some complaint of insects. *Jennings:* Wheat looks badly; chinch-bug and fly eating it up. *Marion:* Wheat-growth retarded by drought and cold. *Saint Joseph:* Soil generally in good order for wheat; better cultivation; yield reduced 5 per cent. on clay soils by the grub and on sandy soils by the Hessian fly. *Warren:* Wheat looks killed; ground frozen 4 inches. *Hancock:* Wheat looks well; increased acreage. *Pike:* Wheat will be injured by the weather.

ILLINOIS.—*Tazewell:* Newly sown grain affected by drought and cold; rain much needed. *Wabash:* Drought injuring the growing wheat. *DeKalb:* Wheat and rye look extremely well, owing to good tilth of soil, fine weather at seeding, and growing rains since. *Jersey:* Wheat injured by drought; in many places but little to be seen. *Lawrence:* Wheat suffering from drought and hard freezing; very poor prospect. *Champaign:* Wheat seriously threatened with winter-killing. *Schuyler:* Wheat materially damaged by the unprecedented drought and cold. *Cass:* Wheat looks poorly; slow coming up; too short growth to stand the hard freezing of winter. *Fayette:* Injured by drought and cold. *McLean:* Early sown wheat looks 200 per cent. better than last year. *Sangamon:* Dry weather and hard freezes have injured the fall grain. *Washington:* Wheat looks well, but is threatened by drought and cold.

MISSOURI.—*Perry:* Wheat injured by excessive drought; barley has failed the last two years; but little sown. *Laclede:* Drought makes wheat and rye look poor. *Cass:* Season too dry for winter-grains. *Charlton:* Wheat very promising. *Wayne:* Drought has limited the acreage of wheat and prevented it from coming up very well. *Audrain:* Too dry for seeding. *Jefferson:* Wheat-sowing retarded by drought. *Crawford:* Drought delayed wheat-seeding, and consequently but little is yet out of the ground; prospect not flattering. *Cedar:* Cold dry weather threatens to injure wheat. *Greene:* Wheat injured by drought. *Mississippi:* Wheat injured by the unprecedented drought. *Moniteau:* Wheat has come up badly, but better than last year; prospect poor. *Newton:* Checked by six weeks of drought.

KANSAS.—*Marshall:* Wheat looks remarkably well. *Ellsworth:* Wheat promising; rye sown for grazing. *Nemaha:* Wheat very encouraging. *Franklin:* Average, but threatened with drought. *Montgomery:* Increased average; looks well.

NEBRASKA.—*Madison:* Prospect good for a small crop of winter-wheat. *Merrick:* White Touzelle wheat from the Department, sown September 30, looks finely. *Nemaha:* Wheat sown late on account of drought; much of it has not come up. *Osage:* Winter-grain injured by drought and cold.

OREGON.—*Clackamas:* Late-sown grain injured to some extent by excessive cold, the coldest weather for a quarter century. *Lane:* Early rains placed the ground in fine order for fall seeding; prospects better than for several years.

UTAH.—*Cache:* No winter-wheat sown; too dry to plow.

Table showing the average yield per acre and price of the principal crops of the United States for 1872, and the area and condition of winter-grain.

States.	CORN.		WHEAT.		RYE.		OATS.		BARLEY.		BUCKWHEAT.		POTATOES, (Solanum tuberosum.)	
	Average yield per acre in 1872, stated in bushels.	Average price per bushel on 1st day of December, 1872.	Average yield per acre in 1872, stated in bushels.	Average price per bushel on 1st day of December, 1872.	Average yield per acre in 1872, stated in bushels.	Average price per bushel on 1st day of December, 1872.	Average yield per acre in 1872, stated in bushels.	Average price per bushel on 1st day of December, 1872.	Average yield per acre in 1872, stated in bushels.	Average price per bushel on 1st day of December, 1872.	Average yield per acre in 1872, stated in bushels.	Average price per bushel on 1st day of December, 1872.	Average yield per acre in 1872, stated in bushels.	Average price per bushel on 1st day of December, 1872.
Maine	36.1	$0 94	17.3	$1 92	18.1	$1 09	29.5	$0 50	20.6	$0 83	25.5	$0 65	94	$0 68
New Hampshire	38.2	95	18.1	1 84	19.5	1 04	33	59	27.5	92	20	57	94	87
Vermont	38	84	16	1 74	17.7	1 13	35.2	48	24	86	18.7	64	107	53
Massachusetts	31	90	17.4	1 95	18.8	1 03	30.4	61	22.8	76	14.2	90	102	88
Rhode Island	31	90	.....	.....	15.3	98	35.6	50	22	90	.....	.....	90	90
Connecticut	32.2	92	17	1 65	16.8	1 10	35.8	61	.....	.....	19.2	96	106	82
New York	37.5	70	12.5	1 65	13	89	35	44	23	81	16	83	88	63
New Jersey	39.5	62	13.5	1 73	13.8	88	28.4	43	.....	.....	17.4	1 00	98	87
Pennsylvania	39	60	11.2	1 67	13.4	86	33.5	43	21.2	88	16.6	93	99	63
Delaware	20	55	7.5	1 60	7.5	82	14	42	.....	.....	20	90	80	1 00
Maryland	23	57	8.5	1 68	11.6	79	16.5	40	.....	.....	19.7	80	53	88
Virginia	19	58	9	1 56	9.5	72	13.5	46	.....	.....	13.5	62	58	72
North Carolina	14.5	62	8.5	1 53	8.4	93	17.5	80	.....	.....	19.1	69	103	70
South Carolina	10.5	96	6.4	1 88	6.2	1 48	8	80	.....	.....	.....	.....	58	1 00
Georgia	13	86	9	1 73	10.2	1 56	11.5	83	.....	.....	.....	.....	83	1 27
Florida	9.6	1 20	.....	.....	.....	.....	11.2	93	.....	.....	.....	.....	102	1 87
Alabama	17.6	78	9.5	1 48	11	1 22	13.5	82	.....	.....	.....	.....	68	1 15
Mississippi	17.5	88	10.3	1 57	9	1 75	13	1 06	.....	.....	.....	.....	85	1 16
Louisiana	20.1	88	.....	.....	.....	.....	19.5	1 32	.....	.....	.....	.....	61	87
Texas	28.5	43	18.5	1 65	21	1 38	32.5	81	35	1 00	.....	.....	124	1 89
Arkansas	24.3	73	10.4	1 52	12.5	1 50	25.5	64	.....	.....	.....	.....	78	1 02
Tennessee	24	48	10.5	1 40	11.4	88	19.6	42	.....	.....	.....	.....	76	57
West Virginia	33.5	55	10.3	1 43	13.5	88	26.2	38	11.5	95	13.4	88	75	60
Kentucky	33.5	37	13	1 29	14.5	73	25.1	49	22	73	.....	.....	93	58
Ohio	39.5	34	11.7	1 42	11.9	73	30	29	23.2	71	13.5	94	72	63
Michigan	36	43	15.5	1 46	14	74	30	32	24.1	81	16.5	76	66	63
Indiana	39.6	29	13	1 32	15.5	65	30.5	25	24	69	19.2	85	75	54
Illinois	39.8	24	13.2	1 23	18.2	50	36.6	19	26.1	55	15	81	85	46
Wisconsin	38	40	15.8	1 03	18.7	57	33.5	32	28.6	57	16.5	60	92	44
Minnesota	35.2	36	18.7	83	19	49	37.5	26	26.7	42	16.1	90	130	26
Iowa	40.8	18	13.7	85	19.5	47	39	16	27.9	42	20.1	69	133	22
Missouri	37	32	10.6	1 41	16	71	33.7	23	23	73	18.9	76	90	50
Kansas	38.5	22	12.6	1 42	18.5	71	32.5	22	28.2	60	19.4	90	95	42
Nebraska	39	18	17.5	78	21.5	40	40	16	31.6	39	27.1	71	120	28
California	40.5	1 00	18.5	1 11	29.1	1 02	38.5	74	22	85	21	1 11	100	1 13
Oregon	29	93	18.2	74	23.2	73	28.2	51	24.6	60	18.6	83	113	55

Table showing the average yield per acre and price of the principal crops, &c.—Continued.

States.	POTATOES. (Batatas edulis, sweet.)		LEAF-TOBACCO.		HAY.		SORGHUM MOLASSES.		WINTER-WHEAT.		WINTER-RYE.		WINTER-BARLEY.	
	Average yield per acre in 1872, stated in bushels.	Average price per bushel on 1st day of December, 1872.	Average yield per acre in 1872, stated in pounds.	Average price per pound on 1st day of December, 1872.	Average yield per acre in 1872, stated in tons and hundredths.	Average price per ton on 1st day of December, 1872.	Average yield per acre in 1872, stated in gallons.	Average price per gallon on 1st day of December, 1872.	Average amt sown compared with 1871.	Condition of the crop compared with an average.	Average amt sown compared with 1871.	Condition of the crop compared with an average.	Average amt sown compared with 1871.	Condition of the crop compared with an average.
Maine					.92	$12 80			80	100	92	101		
New Hampshire					1.02	14 66			100	110	98	102		
Vermont					1.16	13 09			106	113	101	111		
Massachusetts			1,750	$0 29.5	1.12	21 37			102	106	91	105		
Rhode Island					1.08	32 50					90	110		
Connecticut			1,650	32.8	1.13	26 05			100	105	100	105		
New York			1,033	9	1.25	18 60			99	103	98	101	95	101
New Jersey	85	$1 13			1.15	31 60			102	97	93	101		
Pennsylvania	70	95	1,300	14.6	1.12	22 84			101	100	100	101	86	98
Delaware	95	87			.75	30 00			100	110	107	105		
Maryland	88	94	600	10	.70	32 87	80	$0 62	100	100	106	100		
Virginia	71	70	750	10.4	.92	21 25	84	55	107	97	94	93		
North Carolina	115	49	666	10	1.30	14 15	78	56	102	96	96	100		
South Carolina	50	76			1	36 00			107	101	101	100		
Georgia	88	64	500	17.8	1.57	25 31	89	54	100	102	100	101	89	100
Florida	121	70												
Alabama	56	77			1	18 33	67	58	97	96	92	91		
Mississippi	70	72			1.30	24 14	84	71	99	97	111	100		
Louisiana	77	85			1	23 33								
Texas	79	1 19			1.13	13 52	95	78	128	102	104	100	145	109
Arkansas	92	80	950	16.6	1.26	20 00	87	80	115	96	115	102		
Tennessee	70	70	748	11.7	1.21	15 46	105	51	103	96	101	96	100	105
West Virginia	77	1 30	575	10.9	.92	16 57	91	65	104	104	98	101		
Kentucky	77	92	775	8.4	1.32	13 09	91	53	112	95	99	97	83	100
Ohio	84	1 16	1,050	8.1	1.07	14 43	85	60	106	94	92	96	93	87
Michigan					1.25	12 26	101	76	110	105	101	108	100	100
Indiana	84	1 07	716	7	1.24	12 53	88	56	106	97	99	99	93	97
Illinois	76	89	850	8.5	1.45	9 47	96	55	112	56	101	102	99	95
Wisconsin			1,025	8.6	1.26	9 82			133	101	103	90	108	100
Minnesota					1.35	5 67	87	72	131	103	104	84		
Iowa	125	1 41			1.35	6 07	98	54	95	101	97	100		
Missouri	97	93	1,069	9.5	1.20	9 73	113	48	105	91	96	93	89	87
Kansas	121	93			1.35	3 89	106	50	161	112	136	112		
Nebraska					1.40	3 81	141	57	135	104	88	106		
California	172	94			1.44	15 60			125	103	108	100	115	104
Oregon					1.35	17 25			89	98	95	85		

Table showing the condition of the crops, &c., on the 1st day of November, 1872.

States.	CORN.		POTATOES, (Solanum tuberosum.)		POTATOES, (Batatus edulis, sweet.)		TOBACCO.		HAY.		BEANS.
	Product compared with last year.	Average quality compared with last year.	Product compared with last year.	Average quality compared with last year.	Product compared with last year.	Average quality compared with last year.	Product compared with last year.	Average quality compared with last year.	Product compared with last year.	Average quality compared with last year.	Product compared with last year.
Maine	113	110	65	71					170	101	120
New Hampshire	108	112	80	79					123	92	102
Vermont	114	116	86	82					118	90	90
Massachusetts	103	97	90	87					115	96	95
Rhode Island	96	98	92	91			122	81	107	101	100
Connecticut	105	102	94	92			102	101	130	100	101
New York	110	106	90	96			115	110	107	97	100
New Jersey	120	106	75	85	88	91			90	96	100
Pennsylvania	115	100	95	92	100	95	125	102	102	98	103
Delaware	92	100	75	82	80	100			65	85	100
Maryland	98	98	75	95	99	101	102	90	70	98	91
Virginia	93	99	92	91	90	95	102	98	70	95	90
North Carolina	116	102	104	99	99	101	120	103	108	114	108
South Carolina	108	107	87	90	73	80	102	105	94	105	85
Georgia	118	109	89	92	80	91	113	106	98	101	110
Florida	87	97	74	83	94	98			75	100	
Alabama	123	112	94	50	84	90			70	100	100
Mississippi	120	111	94	94	79	89			80	85	95
Louisiana	130	117	85	90	69	78			84	96	
Texas	134	115	143	106	72	95			153	96	84
Arkansas	109	98	93	100	80	90	99	101	102	102	
Tennessee	102	104	100	97	85	96	109	97	95	93	97
West Virginia	106	103	85	98	101	99	112	104	90	99	104
Kentucky	118	109	101	104	101	101	109	102	110	102	106
Ohio	111	102	90	96	96	98	95	97	90	98	99
Michigan	105	103	101	99					102	102	102
Indiana	108	99	115	105	99	100	94	90	104	98	95
Illinois	107	99	135	104	98	97	115	103	105	97	98
Wisconsin	99	98	95	98			95	99	104	102	95
Minnesota	98	98	127	112					101	97	98
Iowa	103	100	109	102	105	99			102	98	103
Missouri	121	100	93	100	98	100	125	103	111	102	99
Kansas	120	103	110	102	121	99			106	100	108
Nebraska	105	101	104	94	104	105			112	96	100
California	127	102	109	100	125	100			145	103	103
Oregon	105	100	124	106					95	98	106

Condition of the crops, &c., on the 1st day of November, 1872—Continued.

States.	PEASE.	BUCK-WHEAT.	FLAX.	COTTON.		SORGHUM.	SUGAR-CANE, (not sorghum.)	GRAPES.	APPLES.	PEARS.
	Product compared with last year.	Product compared with last year.	Product compared with last year.	Indicated product compared with last year.	Indicated product (lint) per acre, in pounds.	Product compared with last year.	Indicated product compared with last year.	Product compared with an average crop.	Product compared with an average crop.	Product compared with an average crop.
Maine	104	103						91	134	100
New Hampshire	100	82						84	145	90
Vermont	98	102						102	90	101
Massachusetts	87	96						71	145	87
Rhode Island								91	148	116
Connecticut	98	97						82	142	100
New York	94	92	101					91	112	87
New Jersey	98	96						91	175	114
Pennsylvania	101	105	98			92		93	137	107
Delaware	75	100				90		105	160	105
Maryland	97	101				96		108	125	110
Virginia	93	97	101	100	190	87		109	103	100
North Carolina	107		97	121	170	86		105	115	102
South Carolina	92			124	182	97	95	97	86	76
Georgia	114			119	180	98	97	101	91	91
Florida	96			102	125		97	105		
Alabama	93			111	167	112	125	95	95	95
Mississippi	83			112	260	82	86	104	81	69
Louisiana	90			121	215		89	81	79	
Texas	76			126	220	95	91	95	91	94
Arkansas	77			105	170	75			77	83
Tennessee	95	96	102	110	190	103		111	95	101
West Virginia	99	94	102			82		97	124	98
Kentucky	102	97	100	98	200	100		109	122	115
Ohio	97	96	89			83		92	115	105
Michigan	96	105				86		100	99	92
Indiana	98	108	88			92		111	103	103
Illinois	99	97	96			96		104	99	93
Wisconsin	92	98				115		98	69	63
Minnesota	101	99	104			91		103	109	
Iowa	99	107	102			95		117	110	93
Missouri	98	104	95	107	270	93		107	97	92
Kansas	101	109				99		122	120	107
Nebraska	100	99	101			101		119	185	202
California	95	93						95	96	100
Oregon	100	119						100	131	116

EXTRACTS FROM CORRESPONDENCE.

CORN FOR FUEL.

Pottawattamie County, Iowa.—Iowa coal is worth $7 per ton; wood from $6 to $7 per cord, according to quality. People are burning a good deal of corn; think it as cheap at 18 cents per bushels as coal or wood, while it is clean, neat, and handy; no dirty hands and no chopping with dull axes.

Harding County.—We had an immense crop of corn in 1871, and nearly as large in 1872. At the gathering of the last crop there was old corn enough to answer the wants of the country until the harvest of 1873. Thousands upon thousands of bushels that were purchased by dealers and shippers last year have been held over, as there has been no time since the harvest of 1871 when it would pay to shell and ship it. Large quantities are now burned for fuel, as it is thought cheaper to burn at 15 cents per bushel of 75 pounds on the cob, than wood at $5 to $6 per cord. A perpetual or "draw" lime-kiln, running night and day, burned large quantities the past autumn with very satisfactory results as to cost, and an extra quality of lime over that burned with either coal or wood; so the proprietor informed me. I myself sold to him old corn at 20 cents, as preferable to the present crop at 15 cents. He ships to the whole west half of the State, to the Missouri River, and even beyond to Dakota.

UNSEASONABLE WEATHER IN TEXAS.

Nueces County, Texas, December 1.—On the 16th of November we had ice half an inch thick, and on the 17th three-fourths of an inch thick. The winter has commenced five weeks earlier than in 1871. Should the cold weather continue the mortality in cattle will be greater than last year. The cattle are in poorer condition and the grass is shorter, owing to the protracted drought of the past summer.

COSTLY HUNTING.

Prairie County, Arkansas.—The fires following the long drought have devastated the country, the loss in this county being about $150,000. This enormous loss has been caused by hunters from Tennessee and Kentucky setting fire to the woods.

THE TIME TO SOW WHEAT AND CLOVER IN SOUTH CAROLINA.

Greenville County, South Carolina.—Ninety-nine times in a hundred wheat planted here by the 10th of October will yield a good crop by the 10th of June. Clover-seed rolled in at the same time with the wheat will give a crop of stubble-hay after the wheat comes off, better than corn-fodder for cattle. If the land is good the clover, which stands three years, yields a larger profit in hay than can be gained by any other crop. Then clover-sod plowed in and put to corn will give thirty bushels to the acre. Then, with six wagon-loads of barn-yard manure, plowed in, the wheat-crop will be from twelve to fifteen bushels per acre.

EARLY SNOW IN UTAH.

Salt Lake City, Utah Territory, December 1, 1872.—On the 25th of October we had the first snow-storm of the season, which was very severe, lasting from Saturday night to Tuesday noon following. A night of dismal coldness succeeded, and storms and cold weather have prevailed up to the present, with but little cessation. Large quantities of winter-apples have been frozen on the trees, and considerable quantities of carrots and other roots have frozen in the ground. The "oldest inhabitant" of these mountains has never before seen winter set in so early and so severely. Mining and other industries seem almost paralyzed—none expecting and none being prepared to meet the inclemencies of an almost arctic winter while yet a month or more of the fall season remained. Much annoyance and considerable suffering has resulted from the temporary stoppage of the operations at the coal-beds.

AN OVERPLUS OF WHEAT.

Alameda County, California, September 1.—Thousands of sacks of wheat still remain on the field where it was thrashed, there being no place to store it. Granaries and warehouses are full, and not one-half ships enough to take the surplus away. Freight now to Liverpool £5 10*s.* against £2 10*s.* last season. In proportion as freights go up the price of wheat declines. There are needed in San Francisco Bay one hundred more ships than are there to export grain. The high prices of labor, sacks, and freights have about discouraged the farmers, so that they are at present doing but little toward put-

ting in another crop. Many who raised thousands of bushels of grain have not been able to pay their debts and go on another season.

November 1.—Many thousand sacks of wheat still remain in the fields, and along the lines of transportation, awaiting shipment. One hundred vessels have already loaded and cleared for domestic and foreign ports, and when as many more shall have loaded there will still be a large amount of wheat to spare.

FLAX.

Washington County, Nebraska.—For the first time since the settlement of this county flax has been raised very extensively. It is estimated that the product of seed will be nearly, if not quite, 5,000 bushels.

BEET-SUGAR.

Sacramento, California.—The Sacramento Beet-Sugar Factory is now in full operation on this season's crop of beets—a fine yield—turning off the finest of sugars of different grades.

TEXAS CATTLE.

Labette County, Kansas.—I live within two miles of the line of the Indian Nation; I can see daily thousands of Texas cattle, of all ages, looking northward wistfully for the day when the statute says they may "cross the line."

Marion County, Iowa.—Feeders are to a considerable extent compelled to purchase Texas cattle in order to get the number desired. Over two thousand have been purchased and brought into this county. With nearly all the purchasers the stall-feeding of these cattle is as yet an experiment. But as corn is very cheap, there being an immense amount, several of our most enterprising feeders have bought them in lots of from 100 to 300 and are feeding them on corn, costing from 15 to 20 cents per bushel.

TEXAS CATTLE DISEASE.

Saint Louis, Missouri.—We have had the genuine Texas fever in that part of the county lying immediately west of the city. In the vicinity of the cattle-yards on the Pacific Railroad, in the western limits of the city, the city cows took the infection, and about 45 have died. At Rock Spring, a mile and a half further west, I saw in a yard where some 40 dairy cows are driven to be kept over night, two cows dead and several sick. Some 35 cows died in that vicinity. At Cheltenham, two miles further west, I lost one cow, and about 40 others died in the neighborhood of the same disease. Some Texas cattle, supposed to be strays, were in the neighborhood about the middle of August. Three miles further west there have been heavy losses, and the disease is still prevailing. The stray Texas cattle had been there also. I know of a loss of over 200 head in this county. With many of the sick cattle there have been veterinary surgeons, but, as far as I know, without effecting any good. Mr. B. F. Thomas, who has lost seven, has two now sick and says he has cured two with aconite. He has administered this to those now sick, but thinks that, at the time, the disease was too far advanced to admit of a cure by it.

AN ADVERSE SEASON—PREVENTIVE OF MURRAIN.

Powhatan County, Virginia.—The current year has been the most difficult and disastrous to farming and planting operations known to the writer in an experience of forty years. Drought prevailed throughout the whole growing season, shortening the crops of every description, except wheat, from one-fourth to three-fourths of the amount usually raised.

Chills and fevers have prevailed to an unusual extent; also, murrain among cattle, and some valuable animals have been lost. Many in this vicinity recommend a mixture of salt and hickory-ashes, in equal quantities by measure, kept in troughs where the cattle can have free access to it during the hot months, as an unfailing preventive, they having tried it for thirty years with entire success. A quantity of sulphur, equal to one-fourth of the mixture of salt and ashes, added to it, has also been found beneficial.

PEA-NUTS IN TENNESSEE.

Wayne County.—Our farmers have never raised any pea-nuts until this year. They have gone into that crop pretty extensively, and will raise about 60 bushels per acre—little over half a crop, owing to the drought we had the latter part of summer.

GRAPES IN CALIFORNIA.

Amador County.—Grapes are good and plentiful, selling for $12 to $15 per ton, or about 40 cents per bushel; can be raised here cheaper than corn or potatoes in Illinois or any other State.

SILK-CULTURE.

Tooele County, Utah.—Mulberry plantations are doing well; sericulture will soon be in full blast.

LARGE CROPS.

Woodson County, Kansas.—From the best statistics I have been able to obtain, and from my own observation, I estimate that we can spare from this county alone 250,000 bushels of corn and 75,000 bushels of potatoes. Such a crop was never raised here before. What we now want is a market.

Linn County.—The corn-crop is quite large. The increased facilities for cultivating (the double-team corn-plow being now generally used) nearly double the acreage.

Cache County, Utah.—We have raised the largest crops this season ever known in this county; and as there are no grasshoppers, there is every prospect of success next season.

OVERESTIMATE OF CROPS.

Stanislaus County, California.—The wheat-crop in this State has been annually overestimated, in the first instance by farmers themselves. As an example, (though an extreme case,) a neighbor stated, in San Francisco, that his yield would reach 20,000 bushels; when thrashed, he had 4,500. This county was estimated at 7,000,000 bushels; as near as I can get true data from my own observation and that of my assistants, after visiting many thrashing-machines, the thrashing does not show half that amount. Many thousand bushels yet remain to be thrashed.

EXPERIMENTS IN RAISING COTTON.

Arkansas County, Arkansas.—I found one stalk of cotton, planted about the 18th of June, on which I counted 115 grown bolls. This will make 1.15 pounds of seed-cotton. An acre of cotton planted 4 feet by 4 feet, and each stalk producing as well as that, would yield about 3,000 pounds of seed-cotton. This year's experience proves to me that a fair crop of cotton can be raised on the bottom-lands, planted after the 1st of June, provided the land is in fair order. I have long been of the opinion that the most economical way to produce cotton is in checks, 4 feet by 4 feet on the bottom-lands, and 3 feet by 3 feet on uplands. I am certain that an intelligent laborer can cultivate twice as much checked, 4 by 4, as in the drill-system, in which at least three-fourths of the cultivating has to be done with the hoe. In the former method the riding sulky-plow can be used to great advantage, leaving little to be done with the hoe.

BENEFICIAL INFLUENCE OF AGRICULTURAL ASSOCIATIONS.

Gadsden County, Florida.—Under the influence of the Gadsden County Agricultural Association, which I am sory to say is the only permanent organization of the kind in the State, the farmers of the county have been greatly stimulated this fall to the seeding of an increased area of oats and a better preparation of the soil. Heretofore, the general rule has been to appropriate to the cultivation of the oat only such portions of the farm as were too much exhaused to produce an average crop of corn or cotton, and consequent failure has been the usual result. But experience has now demonstrated that there is no other crop planted which responds so satisfactorily to a liberal application of fertilizers and a proper preparation of the soil, and I trust that our farmers have entered upon a new era in regard to the growing of this invaluable cereal. In an adjoining county, 84 bushels to the acre in one instance, and 96¼ in another, have been realized on ordinary pine-land suitably fertilized and properly prepared for seeding. They were sowed the later part of October and harvested about the middle of May. The clay lands of middle Florida are admirably adapted to the growing of the oat, and if greater attention were given to it there would never be any serious complaint of a lack of corn.

JUTE-CULTURE IN THE UNITED STATES.

Experiments in cultivating jute in the Southern States thus far indicate that both the climate and the soil are well adapted to its growth, and there is a fair promise that its production will become an extensive and profitable industry in that section. Its fiber supplies material in manufactures for which there is a rapidly increasing demand, and which, except to a very limited extent, does not take the place of cotton; while, therefore, it will not supplant the latter nor compete with it in the market, it may enlarge the area of profitable rural industry in the South. It is claimed that were the South to divide the labor it now bestows exclusively upon cotton between that and jute, the result would be an increase in the value of the cotton-crop, it having been proved that, beyond certain limits, an increase in the product occasions a diminution in the total value; that it supplies the raw material for coarse fabrics, which are now largely imported by the cotton-growing States, but which might be manufactured by their unskilled female laborers at a saving of millions; that it can be raised and prepared for market at a greater profit per acre than cotton.

The following communication has been received from Mr. E. H. Derby, of Boston, who is an enthusiastic believer in benefits to result to the South, and so to the whole country, from jute-culture:

As the jute-plant has been acclimated in the Southern States and I have exerted myself to aid in its introduction, many questions have been addressed to me from the South as to the culture and harvesting of the plant. I have consequently written to a friend in India, and subjoin extracts from his reply, which will be useful to the planter if published in your valuable report. I am convinced by this reply and by other letters from the South that the rich lands of Florida, Louisiana, Texas, and Mississippi, will, with fair cultivation, yield 3,500 pounds, or ten bales, of fiber to the acre, in place of one-tenth of that amount of cotton. I am convinced also that it can be produced at less than one-tenth the cost of cotton, that the caterpillar will not touch it, and that if planted around the cotton-fields it may possibly protect them from that voracious insect. I am also led by my letters to hope that it will attain to its full growth in three to four months, and that the same field may yield two crops in one season. I have just returned from Scotland, where I visited the jute-factories in the flourishing city of Dundee, where the import and manufacture of jute is making wonderful progress.

The subjoined table gives in tons the import and manufacture of jute in that city since 1837:

	Tons.
In 1838	1,136
In 1847	6,966
In 1854	16,590
In 1872	96,000

Since 1854 the increase has been about 500 per cent., and in this interval of time the cotton manufacture has not grown at one-fifth of that rate. Some of the jute-yarn which I saw at the factories is spun very fine and sold for 8 or 10 cents a pound. It is used for bags and carpets, and some of the latter, handsomely colored, have sold for 16 cents per square yard. It is also interwoven with silk, linen, and woolen threads into cheap cloths.

By the subjoined extracts you will notice that the jute-seed from one acre will suffice to plant fifty acres, and that the plant is usually gathered some weeks before the seed ripens. I suggested this idea last summer to Mr. Chapman, of Point Coupee, but presume that most of our planters have this year allowed their seed to ripen, in which case they may have plenty of seed but inferior fiber, and possibly require the ramie-machine to separate the fiber from the stalk, and possibly thus make it available for coarse if not for fine fabrics. The progress of events convinces me that the jute is just what the South requires to diversify its industry and to fill up the gap when cotton is a failure. With the growing demand for it, jute promises to pay much better than cotton.

I noticed in the jute-mill at Dundee that after the jute was sorted a woman placed a layer of it on the floor, then sprinkled it freely, first with water and afterward with

oil; she then placed another layer over that and sprinkled it in the same manner and so piled up layer upon layer. This sprinkling was before the fiber was spun.

An extract from the reply above mentioned is given, as follows:

The quantity of jute and seed produced to an acre depends greatly on the richness of the land it is planted on. Serajgunge, Naranogunge, Dacca, and other northeastern districts, where about four-fifths of the total crop are raised, produced from 2,000 to 3,000 pounds of jute on an average; in some cases, however, as much as 4,000 pounds are produced. The yield of seed is about 1,000 to 1,200 pounds per acre. In the country fifty miles around Calcutta, the production of which is called dessee or country jute, the yield is smaller, being only about 600 to 1,000 pounds of fiber, and more seed, say 1,500 to 1,600 pounds per acre; but on rich, damp lands the product is almost as much as in the northeastern provinces. The dessee description was used only for local consumption until about five years ago, when shipments of it to England began, and both the shipments and production of it are increasing every year. Jute is sown broadcast, and about 22 to 28 pounds of seed are required to an acre. In the northeastern provinces it is planted in February and March, and is cut about the end of June and beginning of July; the dessee is sown in July and cut in August and September. On rich land it grows and ripens quicker. In the northeastern districts, when grown on rich soil, the diameter of the stalk at the bottom is from three-quarters of an inch to one and a quarter inches, and the length from 7 to 10 feet, and sometimes, but rarely, longer and thicker. The country jute is 4 to 7 feet long and one-half to three-quarters inch in diameter. The plants are cut about 3 inches above the ground, excepting dowrah, which is uprooted. The butts are cut at the time of baling the jute for export in Calcutta. When the stalks are cut they are covered with a green bark, which, after going through certain processes, becomes fiber. The planters cannot tell at the time of cutting the stalks whether any, or how far from the bottom any will be hard. The stalks are cut about a month before the seed ripens, and the poorer plants are generally let go to seed. Jute made out of the plants producing seed is hard and barky. The unripe seed cut with the stalks is of no use. It grows best on rich, moist ground, but not on low ground. Castor-oil cake is the best for it, and next to that cow-manure; but the country planters, as the ground is naturally rich, use no manure whatever. An acre of cotton costs much more than an acre of jute. Jute and cotton do not interfere with each other in the least. Cotton grows in the northwestern provinces, Central and Southern India, while jute is raised in Bengal. The little cotton that Bengal produces, and the little jute the cotton districts produce, are of poor quality, and only raised for local consumption. For the last few years jute has been encroaching on the linseed-crop, as the same ground is suitable for both.

The statements above answer, in part, the inquiries in the subjoined communication addressed to this Department by William M. Hazzard, of Georgetown, South Carolina:

The cultivation of rice is attended with so many difficulties and risks, and such an outlay of money, with little or no remuneration, that we shall be obliged to abandon our lands, or introduce some plant less liable to the disasters to which a rice-crop is exposed. From experiments I have seen made I am satisfied that our lands are well adapted to the growing of jute. This plant, whenever tried in the rice-fields, has grown most luxuriantly. I have thus far failed in my efforts to obtain seed enough to plant three or four acres the coming year. I should be glad to obtain all the information the Department of Agriculture can furnish in reference to the time of planting, mode of cultivation, time for cutting, and mode of curing and preparing for market.

A correspondent at Charleston, South Carolina, reports that he planted jute-seed June 10, on very poor land, and October 1 the plants had grown to a height of 6 feet. That it can be raised at the South with success and large profit he has strong faith.

The following extracts from correspondents give the results of their own experiments in growing it:

Orange County, Florida.—I plowed up and thoroughly prepared a half acre of medium grade pine-land, and sowed the jute in drills May 23. It came up well, but owing to the excessively hot, dry weather it all dried up. On the same day sowed a small plat in a bay-head. It came up and grew finely. I am now gathering the seed. Some of it is 12 feet high, and all as high as I can reach, showing that on damp, rich soil it will here succeed finely. This bay-head is muck, several feet deep, which I cleared off and limed two years ago. Upon it bananas grow from 12 to 15 feet high.

Muscogee County, Georgia.—I consider the experiment in jute-raising a success. The cultivation is simple and the cost of production small. I had seeds

sown broadcast on broad beds; some on sandy river land, and the rest on stiff clay land. The latter did very much better than the former. The cultivation was the same, but many of the plants on the sandy soil died out after having attained their full growth, while those on the clay lands remained green and vigorous and matured their seed. The plant requires moisture. The seed was sown in May, and the plants could have been cut in September. A frost, on the 15th of October, which injured the cotton, did not leave its mark on the jute. It attained the height of 15 feet, and in appearance somewhat resembles a plantation of young peach-trees before being removed from the nursery. I had the plants cut in October and steeped ten days in stagnant water, after which the fiber was easily stripped off.

New Orleans, Louisiana.—Jute-seed received from the Department of Agriculture was planted on the 11th of April. The soil was well plowed and harrowed and in good condition. Patch No. 1, rich soil, 3 feet above ordinary gulf-tide, planted in drills 3½ feet apart; patch No. 2, very rich soil, one foot above tide, planted in chops 4 feet by 2½; patch No. 3, same as No. 2, planted broadcast; soil very dry at planting. Seed covered one-half inch deep did not germinate until rain on the 22d of April. May 12. Passed the cultivator through patches 1 and 2. May 27. Chopped with hoe the large weeds from the same; jute 2 feet high; no further cultivation. Patch 3 received no attention after planting. Almost continuous drought this summer; jute suffered, but not so much as corn and other crops. July 10. Cut a portion of patches 1 and 2 9 and 10 feet high; put the same in bayou-water for seven days, and got beautiful fiber the entire length of the plant. July 15. Planted again the land which was cut on the 10th. At this date, October 10, this second crop is 8 feet high, looking well, although it has suffered much from excessive drought. Wishing to save as much seed as possible for a more extended planting the next season, I could afford but a fractional part of an acre on which to arrive at some idea of what amount of fiber we may expect per acre. On the 28th of August I cut a portion of patches 1 and 2, plants measuring from 11 to 13 feet: seed-burs about halfgrown. (This was in accordance with direction in Agricultural Report of 1871, page 172.) The quantity of fiber saved satisfied me that the yield of these patches would be quite equal to 4,000 pounds per acre.

Patch 3, broadcast, is exceedingly dense and heavy; portions being matted with native weeds, it is impossible to make a reasonably accurate estimate of yield per acre.

Wishing to test the aquatic qualities of jute, I selected patch 2, as liable to overflow by heavy rain. The season being almost entirely without rain, I transplanted some of my July planting, when 2½ feet high, into water several inches deep. The plants have continued to grow finely, and are now looking well; this in a continuous flood of water for several weeks.

The above correspondent (F. W. Johnstone) states: "The seed we are now gathering appears larger than that planted—evidently improved. It takes just 600 of the Calcutta seeds to equal in weight 500 of the Louisiana." But it is quite probable that when the newly gathered seed is thoroughly dry it will lose this excess in size and weight. Under date of October 22 he forwarded to the Department three samples of jute-fiber, with a report, of which the following is an abstract: Sample No. 1 was cut four and a half months from sowing, when the most forward seeds were half ripe; No. 2, three months from sowing, when the first blooms appeared. This he thinks the best time, as at that stage female labor can do the cutting, and there being then only one quality of fiber, the expense of slow and tedious assorting and of cutting butts is avoided. No. 3 was from the second crop, planted July 15, and cut two months later. He further reports:

Some of the July planting, second crop, is now fully matured for fiber: some planted the first week in August will make a full crop, unless the frost is unusually early. Inquiries from South Carolina to California are being made of me for seed for next season. I have none to spare. Mr. Chapman, of Red River Landing, is asking $5 per pound. He has two varieties, the pod-bearing and the bur-bearing seed. The pod-bearing variety he thinks much superior to the other. This he got, I think, three years ago, from the Department of Agriculture. The seed the Department sent out last spring was exclusively the bur-bearing, which is brown in color, while the pod-bearing is green. I have some plants which have been flooded constantly for two months now seeding in 6 inches of water.

Charleston, South Carolina.—I have done what I could to encourage experiments with jute, and have distributed hundreds of packages of seed raised by myself. Experiments have been in the highest degree encouraging. The plant seems to flourish quite as well as in India.

Mr. H. H. Stevens, of Webster, Worcester County, Massachusetts, a manufacturer of jute imported from India, to whom this Department sent a sample of that grown in Louisiana for examination, reports that in length, strength, and color it is fully equal to India jute. He adds:

The Department should do all in its power, and, if necessary, ask of Congress more power and more money, to extend the culture of this fiber in the country. Twenty seven years ago, in Dundee, Scotland, the question was, whether there was any value in jute. To-day, of an export from Calcutta of nearly, if not quite, 3,000,000 bales per annum, Dundee consumes a large share.

The Department has received from gentlemen in Louisiana and Georgia very encouraging accounts of their experiments, together with specimens of the jute-fiber which they have produced. Mr. Thomas H. Dunham, of Boston, to whom a sample was forwarded, writes as follows:

The quality is very superior. The market is just now depressed very much. Some parties here have lost heavily on imported jute-butts, and this season (before the fire) India goods were imported at immense loss. The present rate is 6 to 8 cents a pound, (gold;) the usual rate 10 to 13 cents, (gold.) Your sample is very superior, and at 10 cents (gold) it would be safe to quote.

You will understand that our merchants do not favor home-growth of jute, or rather, make light of it; but my advice to you is, leave no step possible to push the jute-growth; make every effort to get it raised here. Beyond and above all obstacles push it on. The country will sustain this to any extent. The motive is greater than you can have any idea of. The moment you get the growth started, you will be fully assured, as capital will follow quickly, as in cotton.

Suppose it were a new growth of cotton, no one would doubt the success, or the aid needed. Our growth of jute will nearly equal half the cotton-crop. We can cut off India supplies, as we have done in cotton.

The interests of our merchants are so interwoven with India importations that they will (as they do) say, "You will never get any quantity grown," and make light of it. But your sample shows that its cultivation is feasible, and it must pay when the market changes. All orders to India are stopped now, and the revulsion will bring jute higher here, within the next year, than it has ever been.

COTTON-RAISING IN CALIFORNIA.

Reference has hitherto been made to attempts at cotton-growing in California, the results of which, during the last two seasons, seem to indicate that the climate and soil of the southern counties do not offer any insuperable obstacle to the production. The small crop of 1871 found a ready home market, being found to possess a remarkable fitness for combination with wool in various fabrics. The wool manufacturers absorbed the product of Merced County, paying 23 cents per pound, and made further inquiry throughout the State for "California cotton." The crop of 1872 has been variously estimated by parties whose facilities for obtaining information entitle their opinions to respect. Mr. Charles S. Capp, in an elaborate paper published in the "Resources of California" for November, gives the entire acreage in cotton during the past season at 800 to 900, averaging from three-quarters to a bale per acre. The San Francisco Commercial Herald, of a later date, gives the entire crop at 1,500 bales. Local estimates fixed the area planted in Kern County (part of which failed) at 500 acres, and the average yield of Merced, Fresno, Tulare, and Kern Counties at a bale per acre. Some isolated experiments, on a small scale, are reported in other counties.

In Merced County, near the villages of Snellings and Hopeton, on the Merced River, several enterprises in cotton-culture were inaugurated. Of these the largest plantation was that of Buckley & Brother—250 acres. These gentlemen, in 1871, raised over 20,000 pounds on 51 acres, an average of 400 pounds per acre. They claim for their crop of this year a far more promising and profitable character. Near them

Colonel J. M. Strong planted 200 acres; Mr. C. S. Peck 75 acres; Mr. C. Deane 25 acres. The total area of all the plantations in this locality was nearly 600 acres. These crops were all raised on alluvial bottoms deposited by the Merced River. They exhibited an exuberant growth of weed, many stalks being from 4 to 6 feet high, with an unusual number of bolls. The lower branches, in some instances, were weighed down so that the bolls rested upon the ground. On thin light soils underlaid with gravel the plant either opened its bolls prematurely or dried up altogether. On moister soils, unirrigated, the growth was sufficiently thrifty—from 3 to 5 feet; on still damper ground, or where irrigation had been used, it was too rank. Near Plainsberg, on Mariposa Creek, about a dozen miles south of the Merced River, about 100 acres were planted in cotton. Mr. H. M. Ruer raised a good crop on wheat-land, unirrigated. He found the best soil to be light sandy loam or sedimentary drift, which, when well pulverized, did not crust or bake. In the same locality Mr. R. Harris planted 27 acres; Mr. T. J. Wilcox 26 acres; Messrs. Turner and Helm 20 acres. The soil of this locality is drier than on the Merced River plantations, and the cultivation not so careful, hence the stand secured was inferior.

In Fresno County Mr. C. D. Davis planted 40 acres, near King's River, using 30 pounds of seed per acre, with irrigation. He was surprised to find the bolls at the second picking as numerous and opening as freely as at the first. His entire expense of cultivation is reported at $770, giving a margin of profit so broad as to induce him to enlarge his plantation to 160 acres in 1873. It is currently estimated that during the coming season 1,000 acres will be planted in cotton in Fresno County.

Mr. G. W. Allan, near Bakersfield, Kern County, exhibited fine specimens of Dixon, Texas, and Golden Prolific cotton, which, though planted late—some of it in June—matured a month earlier than it would have done in his native State, South Carolina, producing a finer and whiter staple. He finds the cotton season of that locality remarkably long, no injurious frosts to be apprehended from April 1 to October 10. Cotton not being planted till after the close of the rainy season does not require the laborious and expensive process of hoeing to keep down the weeds. As it is gathered before the next rain-fall, there is no occasion for "moating" or separating the rain-stained fiber from the clean. Mr. Stein raised a small crop in the same locality in a young vineyard. It was a fair crop, though somewhat neglected in its earlier stages. The growth was as thrifty on the alkaline portions of the field as on any other.

The "California Cotton-Growers' and Manufactures' Association" purchased 10,000 acres near Bakersfield. Of this area only 300 acres were planted the past season on account of the difficulty of obtaining good seed. A portion of this crop being freely irrigated, was ruined by weeds. Other portions, to which this process had been more sparingly applied, produced a fair crop. That portion which escaped the infliction entirely made a remarkably fine growth. Superior samples of Peerless, Dixon, Golden Prolific, and Texas were exhibited, of which the earlier planted were the more excellent. The association proposes to plant 2,000 acres in 1873. To encourage the growth of the staple during the coming season, it will, without charge, furnish the neighboring cultivators with good seed and gin all their crops.

A considerable importation of cotton-gins has been made, especially of portable machines, in different parts of the State. The crop realized from 20 to 22 cents per pound in different localities.

FLORIDA AS A HOME FOR EMIGRANTS.

Mr. John F. Rollins, of Fort George Island, Duval county, Florida, sends the following account of his experiences and observations upon Florida as a home for emigrants:

My plantation is a sea-island in the mouth of the Saint John's River. We have a slight frost occasionally, but the orange and other equally hardy trees do well even further north, *if upon the sea-coast*. I find also that grapes, peaches, figs, plums, &c., do well with me.

I have been a resident here for four years; have passed through many, if not all, the experiences of a new settler in this State, and have come to the conclusion that if those who come here to settle will bring the same amount of health, good sense, money, and pluck which new settlers take to the far West, we should have less complaints of Florida and more successful settlers. The truth is, writers about Florida have given more "flowers" than facts, and hence settlers have come here expecting too much from the climate and depending too little upon their own efforts. It is hardly to be expected that one so sick and broken down in the North that he can live there no longer should be able to come here, bringing, it may be, only a few hundred dollars with him, go into the woods to make him a home, and go successfully through all the hardships incident to such a life. Yet, very many of our new settlers have been of this character, and consequently there have been many failures. Florida is a "land of flowers;" but still it requires time and labor to raise crops and to grow orange-trees. There is no question of the profitableness of fruit-raising. Oranges, lemons, limes, figs, grapes, bananas, pine-apples, pomegranates, peaches, apples, pears, plums, &c., grow well in various parts of the State, and a settler can select his location so as to raise whatever fruits he wishes; but he cannot grow every kind upon the same lot, nor can he expect to have them all in a day. The orange will, of course, be the chief attraction, and settlers will especially desire information about that. I have given this fruit careful study, and find that it flourishes over a large part of the State, though some localities are better suited to it than others. The young trees are tender, and require careful attention and cultivation, but when once established they are hardy; and, having reached the proper age, bear annually large crops of beautiful fruit. As there are no good nurserymen engaged in raising young trees, we have heretofore been unable to procure good ones of any variety, and it would be a great help if the Department would aid us in procuring stocks and seeds to propagate from.

Frosts and the scale-insect are to be contended with by the orange-grower. From all information I have been able to collect, frosts seldom do serious injury, though occasionally a crop may be lost and a few trees killed. As a protection, I would suggest that the limbs of the orange-tree be left to grow as near the ground as possible. Where they are cut off it would be well to place a wide board against the *south side* of the trunk, to protect it from the sun after a freeze, as it is its hot rays shining upon the exposed trunk, suddenly thawing the congealed sap, rupturing the sap-vessels and splitting the bark, which kills or injures the tree. The scale-insect may be disposed of by care and carbolic soap.

It requires about the same time and care to bring an orange as it does an apple orchard into bearing, but the orange-orchard is more profitable than the apple, and full as safe. So with other semi-tropical fruits; when once in bearing in their chosen localities they are very profitable.

The new settler must use good judgment in selecting land for the crop he wishes to grow, and not believe all that is told him by those who have land to sell. Our climate, soil, and crops are so different from those of the North and West that the new-comer has to study each, and often has to learn how to raise a good crop under the teaching of experience—a teaching which is expensive of both time and money.

Of our field-crops, sugar-cane is doubtless the best. It is a pleasant crop to raise, and properly and well manured, has proved exceedingly profitable. By the use of manure, as large crops of sugar-cane can be raised in Florida as in any other State, if not larger; no other State has a climate better suited to its production. Lands not too dry should be selected; those low and moist but well drained are best. Good modern machinery is not very expensive, but if settlements were made in colonies, so that one large mill would answer for all, it would be a decided advantage.

Sweet potatoes, cultivated near a market, are quite profitable. And so of other vegetables. Nearly all varieties grow well here, and the farmer who will give proper attention to the cultivation of a garden need *never* be without fresh vegetables for his table. Many fail in this, and so throw the blame upon Florida; but the reason of their failure is that they do not select a suitable place for the garden, or do not plant at the proper time, and give it due attention subsequently.

The soil of Florida is mostly sandy; some sections, however, have clay and others have limestone formations. Much of the sandy portions is underlaid with clay, and when near the surface the land is good. The State has large stores of natural fertilizers; muck and marl beds are often met with. The lands generally being light, require manure to produce large crops, though good ones are often made without it. If our people used the same amount of manure used in New England, our crops would compare favorably with any section.

The climate is favorable to the prolongation of life, the extremes of heat and cold are less than in the other States, and the air is bland and healing. The out of door life led by the inhabitants tends to health, and when they live in a comfortable manner, have suitable food, and take reasonable care of themselves, there is very little sickness, and very many who come here sick and drawing near to death, recover and become hale and hearty. The new settler should take care to secure a high and dry building-spot, as far from stagnant water as may be. The pine-lands are most salubrious, though old clearings in the oak hummocks are usually healthy. There is more or less fever, chills, &c., but ordinarily these readily yield to proper remedies. Much of such sickness would be avoided by suitable care; new-comers should not work out of doors during July, August, and September between the hours of 11 a. m. and 2 p. m., nor should they expose themselves to the night-air if located in a malarious region. We have a long warm summer, but the thermometer does not rise so high as in the far North. A trip to the sea-coast or to the North by those who live in the interior helps to brace the system up, if by chance it becomes debilitated; in short, a change of scene is a good thing here as elsewhere.

The State has many latent sources of wealth that need to be developed by the busy hands of settlers from older parts of the world. There is room for many thousands; many thousand acres of land are vacant, on which capital, both in money and in labor, can be safely and profitably invested. The people are well-disposed toward all who come among them to settle and mind their own business. Persons wishing to settle here should first come and examine for themselves, go over the State, see what has been done, gain all the information they can from old settlers, *be sure to sift truth from fiction in all that is told them,* and then buy where they like best.

AGRICULTURAL STATISTICS OF IRELAND.

The official report of William Donelly, registrar-general, states that the agricultural statistics of Ireland for 1872 were collected by about 3,800 enumerators, taken from the royal Irish constabulary and metropolitan police, the agency heretofore employed for the purpose. The number of "holdings" visited was about 600,000. The only returns usually required are those of area under each crop, and numbers of farm animals. The census requires two months, and is made in June and July.

The total acreage under all crops was 5,486,522; in 1871, 5,621,437; decrease, 134,915. All classes of crops suffered diminution of area, viz, cereals, 33,361; flax, 34,667; a total loss of 68,028 acres in white crops. The decrease in the green crops was 37,773; meadow and clover, 29,114; or 66,887 acres of the broader class of green crops.

Subdividing these classes, the only crop increased among the cereals was that of beans and peas, while the decrease in wheat was 16,262: oats, 14,323; barley, 2,085; bere and rye, 1,560. In green crops there was increase in turnips, 19,429 acres; mangel and beet root, 2,999; cabbage, 6,387; carrots, parsnips, and other crops, 1,334. Potatoes showed a decrease of 66,632 acres; vetches and rape, 1,290.

The returns give for the total of land in the island, exclusive of the larger rivers, lakes, and tideways, 20,325,693 acres, made up as follfollows: under crops, 5,486,522 acres; grass, 10,241,513; fallow, 18,512; woods and plantations, 325,173; bog and waste, unoccupied, 4,253,693.

Area under the several crops in each year, from 1868 to 1872, inclusive.

Crops.	1868.	1869.	1870.	1871.	1872.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Wheat	285, 150	280, 460	259, 846	244, 451	228, 189
Oats	1, 701, 645	1, 685, 240	1, 650, 039	1, 636, 136	1, 621, 813
Barley	186, 318	221, 710	241, 285	220, 979	218, 894
Bere and rye	9, 906	11, 183	11, 797	11, 555	9, 995
Beans and peas	9, 960	9, 955	10, 689	10, 913	11, 782
Potatoes	1, 034, 681	1, 041, 902	1, 043, 583	1, 058, 434	991, 803
Turnips	320, 094	322, 072	339, 059	327, 035	346, 464
Mangel and beet-root	19, 109	21, 129	25, 400	31, 921	34, 920
Cabbage	32, 875	32, 265	34, 979	33, 008	39, 395
Carots, parsnips, and other green crops	26, 622	26, 501	27, 712	29, 869	31, 203
Vetches and rape	22, 993	25, 395	27, 990	31, 422	30, 132
Flax	206, 483	229, 252	194, 910	156, 670	122, 003
Meadow and clover	1, 692, 135	1, 670, 716	1, 773, 851	1, 829, 044	1, 799, 930

The following are the numbers of live stock for each year, from 1862 to 1872, inclusive:

Years.	Number of horses.	Number of cattle.	Number of sheep.	Number of pigs.
1862	602, 894	3, 254, 890	3, 456, 132	1, 154, 324
1863	579, 978	3, 144, 231	3, 308, 204	1, 067, 458
1864	562, 158	3, 262, 294	3, 366, 941	1, 058, 480
1865	548, 339	3, 497, 548	3, 694, 356	1, 305, 953
1866	535, 799	3, 746, 157	4, 274, 282	1, 497, 274
1867	524, 180	3, 707, 803	4, 835, 519	1, 235, 191
1868	524, 703	3, 646, 796	4, 901, 496	869, 578
1869	528, 201	3, 733, 675	4, 651, 195	1, 082, 224
1870	532, 657	3, 799, 912	4, 336, 884	1, 461, 215
1871	538, 095	3, 976, 372	4, 233, 435	1, 621, 423
1872	540, 745	4, 057, 153	4, 262, 117	1, 385, 386
Difference in numbers betweeen 1871 and 1872	Increase. 2, 650	Increase. 80, 781	Increase. 28, 682	Decrease. 236, 037

Horses are estimated at £8 each; cattle, £6 10*s.*; sheep, 22*s.*; pigs, 25*s.* At this rate the total value of horses in 1872 is £4,325,690; cattle, £26,371,495; sheep, £4,688,329; pigs, £1,731,733; amount, £37,117,517, being an increase of £281,781 over the value of live stock for 1871, estimated at the same rate.

ENTOMOLOGICAL RECORD.

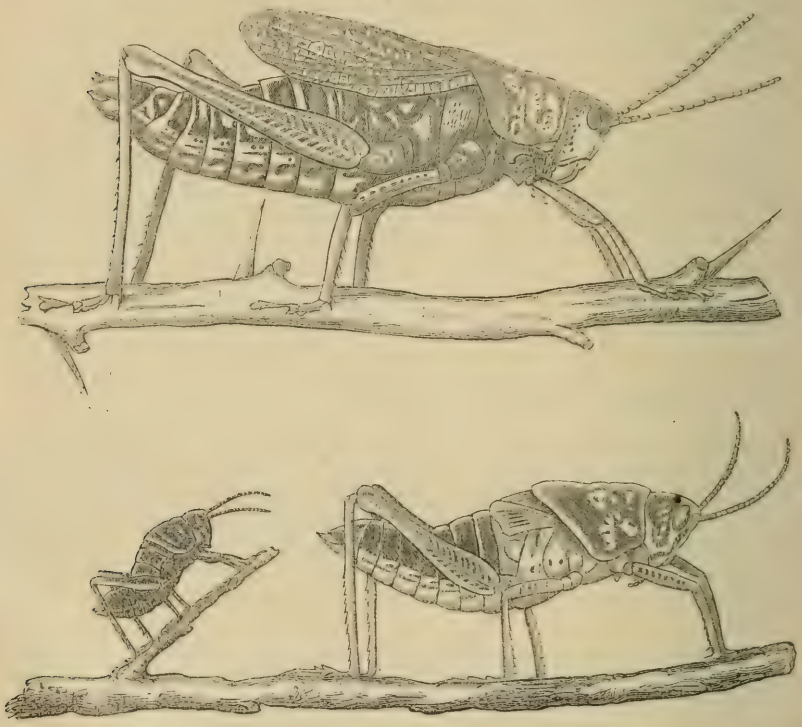
By Townend Glover, Entomologist.

A large grasshopper.—A letter has been received from a correspondent in Louisiana, complaining of the injury done to the truck-farmers by a large grasshopper, which, from his description, appears to be the *Romalea microptera*, (of Serville,) or the *Gryllus centurio*, of Burmeister. He states that the insect has been known for forty years, appearing in May along the South Atlantic and Gulf coast. "Heretofore," he says, "it has been comparatively harmless, but this year it was very injurious to melons and vegetables; it also climbed peach and fig trees to devour the fruit; it cannot fly, as its wings are too short."

The insect was described in the Agricultural Report for 1858, as occurring in Florida, where it was commonly known as the "lubber," from

its sluggish habits. It was very voracious, and was very destructive in the young orange-groves by devouring the leaves. The insects also destroy many garden-vegetables and plants, though they were not especially destructive to them at that time and place, but appeared to be more injurious to the foliage of the orange-tree. They crawl slowly over the ground or upon shrubs, and are so nauseating that even fowls reject them as food. The eggs are probably deposited in the earth; the young larvæ are striped like the mature insects, but are perfectly wingless; they are of a black color, beautifully striped and banded with orange or red, the pupæ also are black, shaded, and bearded on the thorax with yellow or orange red, and the abdomen is banded, and the hind thighs bordered with the same color. The insect, when fully grown, is from 2 to 2.50 inches in length, and is of a yellow or orange color, barred and spotted with black.

Fig. 19.



The wing-cases are extremely short, reaching only half way to the extremity of the abdomen, and are totally useless to the insect for the purpose of flight. These wing-covers are yellowish, shaded with rosy-pink, and are barred and spotted with black. The insects are extremely voracious, and from their large size are able to consume an immense quantity of food, and no doubt, if found in great numbers, would do immense injury in market-gardens, but as they never fly, merely creeping or jumping heavily, they can be readily destroyed by catching in a net, or by crushing with the foot, in every stage of their existence. It would, however, be well to destroy them when very young, as if allowed to grow they will consume as much as half a dozen common grasshoppers (*Caloptenus*) at one meal.

INSECT-INJURIES.—The Hessian fly (*Cecidomyia destructor*) was observed during October in the early sown wheat of Botetourt County, Virginia. The young crop was here attacked also by some unknown insect working under ground and devouring the rootlets and stalks. During November this insect was observed in Frederick, Shenandoah, and Page Counties, Virginia; Clarke County, North Carolina; Fulton County, Arkansas; Berkeley County, West Virginia; Miami and Vinton Counties, Ohio; and Jennings and Saint Joseph Counties, Indiana. In the last-named county the ravages of this insect were confined to sandy soils, while the grub-worm (*Lachnosterna fusca*) operated in clay-soil crops. The chinch-bug (*Micropus* (*Rhyparochromus*) *leucopterus*) was noted in the wheat-crops of Jennings County, Indiana, and Lawrence County, Illinois. Undescribed wheat-destroying insects were reported in Boone and Hamilton Counties, Illinois.

The cut-worm (*Agrotis?*) was destructive to corn in Oakland and Calhoun Counties, Michigan; Outagamie County, Wisconsin; and Franklin County, Missouri. This insect was especially troublesome in corn planted upon sod-land that had not been fall-plowed. The chinch-bug was active in Sangamon, Clinton, Perry, and Lawrence Counties, Illinois; and in Phelps, Franklin, and Morris Counties, Missouri. The white grub was destructive to sod-land corn in Washington County, Rhode Island. Grasshoppers (*Caloptenus spretus*) were complained of in Thayer County, Nebraska, and in Bonhomme County, Dakota.

Grasshoppers destroyed the buckwheat-crop in Lincoln County, Kansas, and Clay County, Dakota.

Grasshoppers damaged the oats in Morgan County, Utah.

Chinch-bugs destroyed the sorghum-crops in Brown County, Indiana, and Phelps County, Iowa; in the former the old Chinese sorghum is especially mentioned, the other varieties not being injured.

In Hamilton County, Indiana, and Lee County, Iowa, the hay-crop was shortened by grub-worms. In Franklin County, Kansas, all the experimental crops of blue grass were swept by grasshoppers. In Kendall and Blanco Counties, Texas, immense swarms of this destructive insect are reported as perforating the earth and laying eggs for their next generation. They afterward departed southward.

In Mecklenburgh County, Virginia, tobacco-worms (*Macrosila Carolina*) were less destructive than usual; these grubs were destroyed by hornets and yellow-jackets. In Nelson County cut worms assailed the crop just as it was planted; as soon as it was above ground, in moist solis, it was injured by horn-worms.

Potato-bugs were reported in Madison County, Virginia; Logan, Tuscarawas, Ross, Pickaway, Morgan, Meigs, Coshocton, Butler, and Ashland Counties, Ohio; Washtenaw, Montcalm, Lenawee, Clinton, and Antrim Counties, Michigan; Marion, Gibson, Decatur, Steuben, and Franklin Counties, Indiana; Winnebago, Putnam, Cass, and Clark Counties, Illinois; Outagamie, Wisconsin; Steele and Redwood Counties, Minnesota; and in Thayer County, Nebraska. In most of these cases the Colorado beetle (*Doryphora decemlineata*) was mentioned specifically. In New London County, Connecticut, the white and wire worms were spoken of; and in Thayer County, Nebraska, blister-flies, as injurious to potatoes. Hardin County, Iowa, was exempt after seven years of visitation. "Tycks Seedling" potato is reported there as "bug-proof."

Much harm was done by cabbage worms in Luzerne County, Pennsylvania, and Cecil County, Maryland.

The canker-worm was destructive to apples in Suffolk County, Massachusetts.

Caterpillars and boll-worms were observed in the cotton-crop in numerous counties in the cotton States, a continuation of the ravages previously reported.

CHEMICAL MEMORANDA.

By Ryland T. Brown, Chemist.

Laboratory work.—The fiber of a species of aquatic grass, (*Sporobolus cryptandrus*,) found growing along the shore of Lake Erie, was sent to the laboratory by H. C. Beardsley, of Painesville, Ohio, to determine its adaptation to the manufacture of paper.

A proximate analysis shows the following composition in 100 parts:

Inorganic matter	1.947
Cellulin, (fibers)	98.053
	100.000

It is therefore rich in the material for the manufacture of paper.

A specimen of marl from Queen Ann's County, Maryland, presented by Thomas Hill, of Baltimore, Maryland, gave on analysis the following result:

Moisture, (determined at 100° C)	0.2700
Carbonate of lime	57.0445
Phosphoric acid	0.7097
Sesqui-oxides of iron and alumina	2.1103
Silica	39.8655
Magnesia and potash, of each	a trace.
	100.0000

W. A. Hein, New Iberia, Louisiana, asks the analysis of a species of muck which is abundant in that vicinity, and which he proposes to use as a fertilizer. In 100 parts, it has the following composition:

Moisture, (determined at 100° C.)	21.300
Organic matter	38.200
Oxides of iron and alumina	2.832
Phosphoric acid	0.678
Lime	0.310
Magnesia	0.388
Siliceous matter	35.622
Loss	0.570
	100.000

Mr. J. H. Philips, Spring Bluff, Adams County, Wisconsin, presents a sample of shale or rock of which he wishes to know the value as a fertilizer. On analysis it shows the following composition:

Water, (determined at 100° C.)	1.700
Siliceous matter	43.110
Iron and alumina, (oxides)	20.655
Lime	5.360
Magnesia	11.560
Soda	3.446
Carbonic acid	14.258
Phosphoric acid and potash, of each	a trace.
	100.089

A package of mineral phosphate from near Charleston, South Carolina, was sent to the laboratory by the Commissioner of Agriculture. Its composition is—

Water, (determined at 100° C.)	4.4750
Organic matter	33.8400
Insoluble silica	7.8620
Soluble silica	0.6650
Oxides of iron and alumina	7.2702
Insoluble phosphoric acid	16.3485
Soluble phosphoric acid	1.3860
Lime	18.0591
Magnesia	0.1360
Potassa	0.1541
Soda	1.3286
Chlorine	0.5960
Sulphuric acid	6.8712
	99.9927

VALUE OF CITY WASTES.—The German system of experimental stations is furnishing scientific agriculture with *data* which cannot fail to have an important bearing on the production of that region. Mr. Lepmann, director of the central station in Bavaria, speaks of the loss of fertilizers in the wastes of the city of Munich, which he estimates as containing a population of 177,000. The amount of available nitrogen annually lost in the human excrements, fluid and solid, of that city, he places at 1,857,714 pounds; to which he gives a value (reduced to our currency) of $453,467. This gives an aggregate loss of nearly half a million of dollars. While this waste is being suffered the German fields are enriched by an annual importation of 1,000,000 hundred-weights of Peruvian guano, at a cost of about three millions of dollars. Munich, however, is but one of a number of German cities whose wastes, if calculated at the same ratio, would be equal in value to the fertilizers imported. Mr. Lepmann proposes that this waste be saved.

ABSORPTION OF AMMONIA BY CHARCOAL.—Journal of the Chemical Society (London) gives a very interesting series of experiments on the absorption of gases by charcoal, as that phenomenon is effected by temperature. The experiments were conducted and are reported by John Hunter, M. A., and were performed chiefly with gaseous ammonia and cocoa nut charcoal. The principle established by these experiments is that the absorbent power of charcoal diminishes from 0° C. to 55° by a ratio corresponding to the change of temperature; but above that temperature the ratio constantly decreases as the heat increases. These facts have an important agricultural bearing. Vegetable mold owes its dark color chiefly to the presence of carbon, substantially in the condition of charcoal, and on this, to a great degree, depends its power to absorb gases. At night, when the temperature of the soil falls to 15 C. (60 F.) the absorption of ammonia will be active and a stock will be accumulated in the soil; but when the temperature rises with the sunshine the function of the leaves become active and the supply of food for the roots is diminished.

THE BLACK SOIL OF RUSSIA.—We reproduce the following paper from the researches of L. Grandeau, into the nature of the black soils of Russia. This investigation has an important bearing on American agriculture, as we have in the Northwestern States and Territories thousands of acres which agree in chemical composition and in physical properties with these Russian soils. The chief importance of these researches, however, is found in the light which they throw on the part which oxalic

acid and carbonate of ammonia play in rendering soluble the mineral elements of plant-food. But the paper will speak for itself, and we ask for it a careful perusal:

The point of departure in my researches is a work upon the black soils of Russia, the fertility of which is well known. Having at my disposition large samples taken from a vertical section of three meters (9 feet 9 inches) at Uladowka, (Podolie,) I have been able to make a complete examination of a soil which, having never received any manure of any kind, and having been submitted to triennial rotation, produced for several years 22 hectoliters (about 62.4 bushels) of oats and 30,000 kilograms (66,000 pounds) of beets per hectare, (2.47 acres.)

The chemical composition of these soils does not indicate a persistent fertility; and it was to determine the cause of this which led me to the results which form the subject of this memoir. The black soil owes its color and perhaps its fertility to a particular combination of the organic matters with silica, phosphoric acid, iron, lime, and magnesia, which I have separated, and of which I shall describe the principal properties, united in the soil, in all probability, with earthy bases. This complex substance is not removed, in its natura state, either by water, or by acid or alkaline solutions. It is first necessary to destroy the calcareous combination in which it is engaged. We may proceed in the following manner: treat the soil with a slightly acid solution, wash by displacement in order to remove the excess of acid, moisten the residue with ammonia, and exhaust the soil by continued washing with ammoniacal water. The black matter is thus dissolved, the soil is completely decolorized, and its physical and chemical properties sustain important modifications.

The dark-brown solution thus obtained, treated for the ordinary re-actions of phosphoric acid, iron, magnesia, lime, and silica, does not indicate the presence of any of these substances, which facts correspond with those observed by Th. de Saussure in his classic researches upon the soils.

Evaporated to dryness it gives a brilliant black residue, brittle and soluble in the alkalies. When calcined this carbon leaves a red colcothar residue, whose coloration and weight vary with the nature of the soil from which it is obtained. This carbon will, as the case may be, give from 2 to 60 per cent. of its weight of ash. Treated with nitric acid this residue is partially dissolved; the soluble part consists of the phosphates of iron, manganese, lime, magnesia, and potassa. The part insoluble in nitric acid is completely attacked by sulphuric acid. It consists of silicate of iron containing a little silicate of lime. I consider it due to M. P. Thenard to recall here the important part which he was led (in 1858,) according to his experiments to assign to the silicates as solvents of the phosphates in the soil.

As we have seen, ammonia, in certain conditions, dissolves in the soil the phosphates of iron, lime, magnesia, and silica in a state of combination which chemistry has heretofore been unable to produce.

The black soil which I have analyzed contains, per 100 grams of soil, 0.30 gram of phosphoric acid, of which 0.16 gram, that is to say 80 per cent., is in a state easily rendered assimilable by vegetables, as we shall see further on. The soil of Russia gives per kilogram 42 grams of this black matter, leaving by calcination 21 grams of ash.

The analyses of different soils collected in my work and the comparison of the agricultural products of these soils show that there is a close relation between the fertility of a soil and its richness in matters soluble in ammonia, (especially phosphoric acid in this particular state.)

What are the re-actions under whose influence the organic matter combined with the earthy basis in the soil in nature are placed at the disposition of the roots of vegetables? The following facts seem to me to offer a satisfactory response to these questions. I have ascertained that the intervention of a strong acid, such as chlorhydric, is unnecessary; a dilute solution of oxalic acid will set free, in the soil of Russia, the matter soluble in ammonia. When the black soil is treated with oxalic acid, then with water, and finally with ammonia, we obtain a brown solution containing phosphoric acid, iron, lime, magnesia, and silica, as with chlorhydric acid. The oxalic acid, which usually appropriates the calcareous elements of the soil, is unable to precipitate the lime engaged in this organic combination.

After having endeavored, without any decided success, to substitute free carbonic acid gas for oxalic acid, I have completely succeeded with carbonic acid, combined with an alkaline base, especially with carbonate of ammonia; a dilute solution of this salt passing slowly through a layer of black soil plays successively the part of an acid and that of a base, vis-à-vis, upon the black matter in question; at the beginning of the experiment the carbonate is decomposed, its carbonic acid combines with the lime, which renders the black matter of the soil insoluble; the ammonia thus set free dissolves the black substance liberated from the lime, and the soil is decolorized; the deep-brown solution, evaporated to dryness, gives a red residue, (phosphoric acid, iron, lime, magnesia, and silica,) exactly analogous to that which I have described

above. We have reason to think, therefore, that carbonate of ammonia is the true natural agent for the solution in the soil, of iron, phosphoric acid, silica, lime, and magnesia, that is found in that particular state which is the object of our study. If I add that farm manure, treated in like manner as the soil, gives all the points comparable to the ammoniacal solution of this black soil, I shall have pointed out the principal results of my analytical researches.

It now remains to examine how this solution of phosphates, silica, lime, &c., behaves in the nutrition of vegetables and the influence exerted by their presence or absence in soils having other parts identical. I have undertaken, for this object, direct experiments, the results of which I have the honor to communicate to the academy, whatever may be the end. I shall now endeavor to show how the black solution extracted from the soil behaves in a dyalizer. In the interior vessel I placed a solution of black matter, giving by calcination 53 per cent. of mineral residuo, (compared with the weights of dried black matter.) After thirty-six hours the exterior liquid, (distilled water,) which had remained entirely colorless, was evaporated and the residue analyzed. The latter, which contained no carbonaceous matters, was composed of phosphates of iron, manganese, lime, magnesia, and a small quantity of the black solution of soil, less the organic substances. The liquid of the interior vessel was evaporated, and the residue, calcined, gave but 8 per cent. of ash; 85 per cent. of the mineral elements having therefore passed through the membrane. It seems to me to result in this: 1st. That the mineral elements in question (phosphoric acid, iron, lime, magnesia, &c.) are in a state directly assimilable by the vegetables, or that they may be more or less absorbed by the roots. 2d. That the organic matter of the humus is not absorbed and remains in the soil.

It follows from all the facts recorded in my memoir, 1st. That fertile soils contain the nutritive elements under the form offered in farm manure. 2d. That the fertility of a soil is intimately connected with the richness in the mineral elements and organic matter soluble in the ammonia which it contains. 3d. That the organic substances are in nature the vehicle of mineral plant-food, which they extract from the soil in order to present them under a form immediately assimilable by the roots of vegetables.

SCIENTIFIC NOTES.—Professor Roscoe, in a recent lecture, gives the results of his observations on the sun's rays. The intensity of solar heat reaches its maximum some time after the meridian, but the chemical rays have their highest force at noon. The chemical intensity of the solar rays appears to depend entirely on their approach to the vertical direction, and therefore have equal intensities at equal distances on each side of the meridian. The chemical power of sun-light also varies with the place of observation in a manner which cannot be accounted for by the difference in latitude. Professor Roscoe gave the results of measurements made at Kew, at Lisbon, and at Para. At Kew the chemical intensity was represented by 94.5, at Lisbon by 110, and at Para by 313. A hazy atmosphere appears to cause the absorption of the chemical rays in a remarkable degree. This would appear to demand a clear atmosphere for the healthy condition and rapid growth of vegetation.

Influence of alcohol on animal heat.—The old idea that alcoholic drinks heighten the temperature of the body has received numerous contradictions in recent times. C. Binz (N. Repert. Pharm., xxi, 116, 122) communicates the results of experiments performed by Dr. Mainzer on himself and on another healthy individual of strong constitution. The experiments were carefully performed, avoiding all possible sources of fallacy. Dr. M., in making observations on himself, lay in bed lightly covered, and determined the temperature by means of a very delicate thermometer, the indications of which were read off every fifteen minutes. The alcohol was taken between 7 and 10 in the morning, 3 and 7 in the afternoon, and 9 and 12 in the evening. The alcohol (98 per cent.) was diluted with thrice its bulk of water, and the quantity varied from 15 to 80 cubic centimeters. As the result of his observations, Dr. Mainzer concludes that there is no appreciable alteration in the temperature when alcohol is taken in the above doses.

Cultivation of the cinchona-trees in Java.—The Journal de Pharmacie et de Chimie for October says: "In a letter from M. Van Gorkom,

the author states that the cultivation of these trees prospers in every respect; a manufactory has been established for the preparation, on the spot, of alkaloids, (quinine, &c.,) extracts and other pharmaceutical preparations derived from the cinchona-barks, and six tons of that bark were sold by public auction at Amsterdam in March last. The annual expenses of cultivation, &c., are now balanced, and all the original outlay of capital is expected to be returned before the year 1876."

Paper from wood.—In the manufacture of paper from wood the pulp was formerly produced by mechanical means chiefly. A new method, invented by Sinclair and improved by Unger, has been adopted in Germany, it is said, with good success. The wood is treated with strong soda-lye under pressure of six atmospheres. The fiber is bleached with chloride of lime as usual. It does not require grinding to form a pulp, and a good substantial paper is produced without a mixture of rags.

Ammonia in bituminous coal.—Dr. Gerlach in a recently published essay, entitled "Investigations of some of the ammoniacal waters of gas-works," gives an interesting exhibit of the amount of ammonia, and the form in which it exists, in the coals of Saxony. At the Chemnitz gas-works, where the Zwichau coal is used, he found the water to contain hyposulphite of ammonia, 0.103; sulphide of ammonium, 0.034; bicarbonate of ammonia, 0.105; carbonate of ammonia, 0.456; sulphate of ammonia, 0.046; chloride of ammonium, 3.046. Gas-water from the Bonn gas-works, where Ruhr coals are used, contains hyposulphite of ammonia, 0.503; sulphide of ammonium, 0.622; bicarbonate of ammonia, 0.245; carbonate of ammonia, 3.312; sulphate of ammonia, 0.130; chloride of ammonium, 0.374. These numbers relate to grams in 100 cubic centimeters.

Improvements in street-cars.—We are pleased to observe that Mr. Stephenson, of New York, whose name is favorably associated with the building and furnishing street-cars for the principal cities of the world, has introduced several improvements in the construction of that almost indispensable vehicle. The first of these relates to the method of connecting the running-gear to the body of the car. This improvement consists in the use of rubber, or other elastic material, interposed between the iron connections, so as to relieve passengers from the annoyance of the clatter and noise of the wheels, and the disagreeable jar produced by the application of the brakes. Another important improvement consists in substituting a spring-check for the axle-shoulder. This is designed to relieve the concussion felt when the car is forced from side to side by the inequalities of the track. What remains now is to discover and apply some cheap and efficient power for propelling street-cars. The late visit of the horse-disease to our principal cities has impressed us with the importance of this matter, and taught us how inconvenient it would be to return to our former methods of city locomotion.

Native sulphur.—At the late meeting of the British Scientific Association, Dr. J. W. Mallet reports the discovery of a remarkable bed of native sulphur in Louisiana, at a point about fifty miles east of the Texas line. A boring struck the bed of sulphur at the depth of 450 feet, and, after penetrating it 100 feet, passed into gypsum underlying the sulphur. We have heretofore regarded native sulphur as of volcanic origin; but there is no evidence of volcanic action in this vicinity. It is stated, in the paper referred to, that the sulphur is more or less mixed with calcium carbonate, which would indicate deposition from water; but sulphur, except in chemical combination, is not soluble in

water, and therefore could not have been deposited by precipitation. It is said that petroleum is found on the surface in this vicinity, and combustible gases escape in the same locality. Did this bed of sulphur originate in the decomposition of carbon sulphide formed in connection with petroleum? The question of the origin of this sulphur-bed is one of transcendent interest in mineralogical chemistry.

Uniform standard of measures, &c.—The scientific circles, both of Europe and of this country, are continuing the agitation of the question of uniformity in weights, measures of length and capacity, coinage, &c. When nations were isolated, as they were five hundred years ago, each one could have its own standards; but the present state of intercommunication demands uniformity. This is not merely the demand of commerce and trade, but the scientific investigations of the age require uniformity in standards of comparison, in the several fields where these are prosecuted. Nothing can be more absurd than the English system of weights and measures, which in the main we have followed. For example: we write—*it weighs an ounce.* Now, who knows precisely our meaning? It may be the avoirdupois ounce—the sixteenth part of a pound; or it may be, as the word means, (Latin, *uncia*,) the twelfth of a pound. Science demands something more certain than this. If there are formidable objections to the French decimal system, they must be removed, or some other standard, divided decimally, must be adopted. This must extend, especially, to the measures of temperature, so as to abolish the present confusion, consequent on having three standards of graduation in thermometers.

Effects of compressed air on combustion.—James B. Eads, in his report of 1870 on the bridge at Saint Louis, stated that the combustion of candles in the caisson, under the influence of compressed air, was much more rapid than in the open atmosphere. This conflicted with the result of experiments previously made by certain European scientists, which conflict induced Mr. Eads to review the conditions under which his former conclusion was reached; and now we have the statement from him that combustion is not more rapid in compressed air, but that it is more persistent than in common atmosphere. The difficulty of extinguishing the flame is the effect of compression forcing the oxygen into more intimate contact with the combustible body.

BOTANICAL NOTES.

By Geo. Vasey, Botanist.

A poisonous Rudbeckia.—A few weeks ago a package of leaves and roots was received by this Department from Mr. William Kancher, Oregon, Missouri, with the statement that the plant was causing the death of many hogs in that county. An examination proved this plant to be a species of *Rudbeckia*, (*R. laciniata*,) a plant of the order *Compositæ*, and nearly related to the sunflowers. As poisonous plants in this family are very uncommon, Mr. Kancher was requested to make further investigations respecting the plant and communicate to the Department. The following is his reply:

Dear Sir: Yours of the 15th instant, in relation to the samples of *Rudbeckia* sent by me to your Department on the 11th instant, is before me. You express a doubt of the injurious effects reported by me, and desire that I should make a closer investigation of the matter. I have accordingly made numerous inquiries among those who claim to have had hogs poisoned by this plant, and find that all agree as to the plant, and that those I sent you are identical with the plant pointed out to me as the one which did the injury complained of.

The effect claimed is delirium succeeded in a few hours by death. The hog invariably seeks water, and if he reaches it remains in it until he dies. Vomiting and purging often occur, and are considered favorable symptoms. The discharges are green. Milk and lard are the most effective remedies, and always give relief when the animal is discovered in time. A number of cases were named to me where the hogs had passed into an extreme state of delirium, but were relieved in a few hours by pouring a pint of milk and lard mixed down the throat, and restored to complete health without any other treatment. This plant is very plenty along the creeks in this county, and is among the earliest in the spring to send forth its leaves, which are eagerly eaten by hogs when turned out. It is also the latest green thing that grows in the fall of the year, and is then eaten by the hogs. During the summer months they do not eat it, probably for two reasons: the plants are then tall and not so tender, and there are many other things then for them to eat. The plant is used by some people very early in the spring for "greens," but all seem careful to avoid using it except when very tender, as it seems to be the general belief that it is poisonous; indeed, cases have been cited to me wherein the same results followed the use of it by persons as has been observed in the hog, except that none have been fatal.

We publish these statements to call attention to the circumstance and stimulate further inquiry. When used for greens, the boiling will probably dissipate the poisonous property. The leaves of many composite plants have an acrid, irritating property, and a few are known to be virulent poisons.

POTENTILLA FRUTICOSA, OR SHRUBBY CINQUE-FOIL.—In the last Monthly Report, in an article on garden-shrubbery for frontier settlers, this shrub was mentioned as one which might readily be obtained in many northern localities, and placed in the gardens as an ornamental shrub. We have received from Mr. T. S. Gold, of West Cornwall, Connecticut, a protest against its use for this purpose, for the following reasons. He says:

It is known here by the name of "hardhack," and it is the worst plant we have. It is vastly more injurious than the Canada thistle or the daisy. Scarcely known fifty years ago, it now covers, to the exclusion of everything else, thousands of acres in Northwestern Connecticut and Western Massachusetts. It delights in strong, damp pasture-land, and it is rapidly taking possession of such fields. Plowing destroys it: mowing keeps it under, and it only spreads in moist, rough pasture-land. It spreads alone by the seeds, which are blown on the surface of our winter ice and snow to great distances, and, seeding in a settler's yard, it would come up in any damp fence-corners where the seed would lodge. It is a new-comer here, and is twice as abundant as it was twenty-five years ago. Our old men well remember when it first attracted their attention. Though still unknown in some towns, it is decidedly the worst plant we have in Berkshire and Litchfield Counties.

TREES FOR CULTIVATION.—Mr. Samuel Preston, of Mount Carroll, Illinois, in a letter to this Department, writes that, in the list of forest-trees adapted to growing on the western prairies, published in the Monthly Report for August and September, the best and most important of all is omitted, viz, the American chestnut. He says:

It has generally been supposed that the chestnut could not be successfully raised upon our prairies. But my experience, and that of others, proves it to be a mistake. I have them seventeen years old, and bearing nuts, and some of the trees are 12 inches in diameter. They grow faster than the butternut, which I also have of about the same age. I have never succeeded in transplanting the chestnut, while I have transplanted the butternut with a loss not to exceed 2 per cent.

For a wind-break I would substitute Lombardy poplar for cottonwood, as being more easily raised from the cuttings, bears closer setting, has a more sightly appearance, has no cottony down to fill the air, holds its foliage much longer, and, therefore, is a much better wind-break to an orchard. I have both, and at this writing (October 14) the cottonwoods are bare of leaves, while the Lombardies are full of foliage, and look as fresh and green as in midsummer.

EXPERIMENTS WITH FOREST-TREES IN KANSAS.—In the Kansas Farmer we find an account of the condition and growth of various kinds of forest-trees on the grounds of the State Agricultural College at Manhattan. We notice that on *upland*, seedlings of the present year, of green ash, have made a growth of 1 to 2 feet; ailantus, 20 to 30 inches; catalpa, 1 to 2 feet; silver-maples, 24 to 50 inches; black walnut,

12 to 14 inches. All these are on the hills north of the college-building, in a locality much exposed to winds, and on a gravelly soil. In another part of the upland grounds, silver-maples, from seed planted in 1871, are 8 to 10 feet high; ailantus, of same age, 7 feet, and very vigorous; white elm, three years, from seed, 8 to 10 feet high; chestnut, three years old, about 3 feet. In several places on the upland were cottonwood-trees, some from chance seed and others from cuttings, all showing the vigor of this great native tree. Both the native willows and willows from cuttings received from this Department had made a very satisfactory growth.

"No one looking at the pines near the college-building can doubt the feasibility of covering the uplands of Eastern Kansas with pine-forests. Upon the whole, the experiments with forest-trees at the State Agricultural College, though on a limited scale, are highly satisfactory in their results. They show with what ease the prairie farmer may surround himself with trees from seeds and cuttings of the natives. But how many farmers will heed the lesson?"

MICROSCOPIC INVESTIGATIONS.

By Thomas Taylor.

Potato blight and rot.—The potato-disease was first observed in Germany, near Liège, in 1842; in Canada in 1844, and in England in 1845. In the following year it prevailed very extensively over almost all parts of Europe. The summer was unusually cloudy and moist, a circumstance which probably had some effect in fostering the disease. It has been estimated that the damage sustained by Great Britain and Ireland for the year 1845 was not less than £21,000,000, and in 1846 probably twice that amount. The London Times estimates that the loss sustained by Great Britain during the present year, in consequence of this disease, will be about from twenty to thirty millions sterling. Many of the best minds of Europe are now engaged in investigating the nature of the disease, and recent microscopic investigations show that, notwithstanding the fact that during the last thirty years the potato-rot has been attributed to the presence of a parasitic fungus known as *Botrytus infestans*, a new form of fungus has been lately discovered in the rotting potato by Dr. M. Payen. Berkeley and others, however, consider the form to be probably a secondary fruit (oospore) of the potato-fungus itself. Further investigations are deemed necessary, as the habits of the fungus are not yet fully understood. It has long been observed that the fungus attacks the stalks first, causing brown blotches. The disease is next transmitted to the tubers. If we take a withered stalk, which has decayed in consequence of the fungus, it will be found that the brown markings have ripened into forms similar to those discovered by M. Payen, and if a longitudinal section of the stalk is made, it will be seen that the interior is also covered with these spores highly matured and generally connected with a very slender jointed light-brown *mycelium*. The dark rounded forms are visible to the naked eye, but when viewed under a power of 50 diameters they appear to vary in size, although with this power they generally appear to be about the size of a large pea. Some are elongated, and all are of a very dark brown color.

Fig. 21. A represents various groupings on the interior of the stalk. When highly matured they are covered with dark-brown, ridged, thorn-like appendages having a slight wavy appearance.

Fig. 22. B represents a longitudinal section of the stalks; 1, 2, 3, 4, dotted ducts; 5 and 6 spiral ducts; 4 and 6 are represented as being choked up by means of budding spores, which were probably absorbed as germinal matters and matured as represented into well-defined cellular structure. Their enlargement by the mere process of budding would tend not only to fill up the whole air-space, but also to burst the cell-walls, destroying the functions of the plant. U, budding-cells passing through dotted duct-cells. S.S.S.S, the newly discovered fungi-fruit, (oospores.)

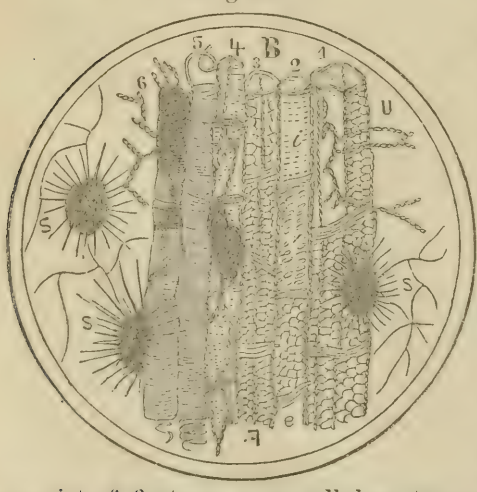
Fig. 21.

Fig. 23. C represents a highly magnified interior view of the cells of the skin of an affected potato, through which a dark jointed amber *mycelium* traverses. I have not been able to detect any form of *mycelium* traversing the potato-cells, except on the interior surface of the skin; but judging from the the habits of *mycelium*, I doubt not but that it may be found traversing the interior of the vascular bundles of potatoes highly decayed, and as described by Dr. Payen.

Fig. 24. D exhibits the appearance of a section of potato showing the starch-cells and vascular bundles, dotted ducts, and spiral forms intermixed. The largest cells shown are more highly magnified to illustrate their real character. They exhibit three belts or rings, and these represent three distinct cell-formations. The interior or third cell contains the starch.

Fig. 25. E exhibits a section of a potato; *g*, the root-stem; *a*, *a*, section of eyes; *t*, *t*, *t* exhibits the position of other eyes, but not in section. It will be seen that the inner markings exhibit a series of central circular and radiating lines leading from and returning to the root-branch *g*. These lines represent the arrangement of the vascular bundles of the potato. When a potato is cut in two sectionally, lines will be exhibited as shown, especially if a "pink-eye" potato is used; and, if exposed to the action of the air for a short time, the nitrogenous matter in the immediate vicinity of the vascular bundles blackens. I have stated that the starch is inclosed in three cells. These consist of, first, an outer cellulose, transparent cell; secondly, an opaque nitrogenous cell; and, thirdly, of an inner cell, composed of very trans-

Fig. 22.



parent cellulose, in which the starch-granules grow; *b* represents such a cell. These cells contain 30 to 40 starch-granules. C represents a broken cell from which the starch is seen as if in the act of leaving; *s* represents a portion of a broken cell; *p*, precipitated starch.

On receiving some diseased potatoes from Mr. B. P. Ware, of Swampscott, Massachusetts, under date November 1st ultimo, I commenced a series of experiments on them, having in view the detection of the mode of action of the fungus on the nitrogenous matter of the potato and other considerations. I arranged five vessels as follows: into No. 1 put a solution of sulphate of copper; into No. 2, a dilute solution of sulphite of soda; into No. 3, the milk of caustic lime in excess; into No. 4, a very dilute solution of carbolic acid in water; into No. 5, pure water. I placed in each solution half of a diseased potato. The following will show the action and results after six days' saturation. The potato in No. 1 solution was found to be perfectly preserved and deodorized, so that it could be sliced into sections, and preserved for future use. No. 2 solution failed to preserve, deodorize, or prevent the destructive action of the mycelium of fungus, contrary to expectation. No. 3 destroyed the odor on application, but in two days the lime became completely carbonated, forming a mass of chalk, when the offensive odor appeared again, and decomposition of the nitrogenous cell went on as if lime had not been present, and infusorial life, in the form of bactari, appeared in great numbers. No. 4 specimen was preserved completely. In No. 5 specimen decomposition seemed to have been slightly retarded at first, but the decomposition on the third day was in full action, and the odor became very offensive before the sixth day. When a portion of No. 3 was placed on a microscopic slide, and secured by means of a glass disk, and viewed under a power of about 75 diameters, masses of starch-grains appeared in cellulose cells all over the field, resembling *d*, Fig. 5. A reference to Fig. 6 F will show the position of those cells *a*, *d*, *t*. They are held in position in the potato by the nitrogenous cell *t*, which is held in turn by an outer and inner cellulouse cell, *a*, *d*. When a sound

Fig. 23.

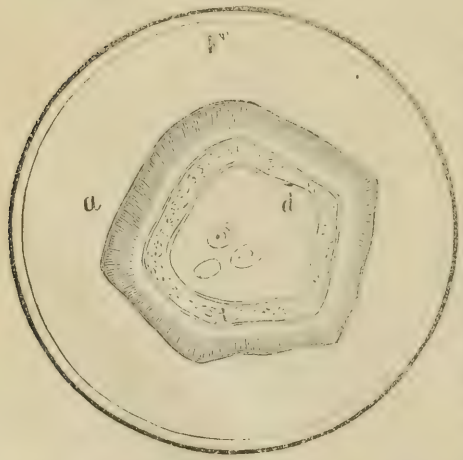
Fig. 24.

potato is grated down, all these cells are broken, because of their perfect cohesion to one another. One cell cannot be broken without breaking all. But in the case of rotting potatoes, the nitrogenous cell which binds the three together is partly removed by the fungoid action, but principally by infusorial life (*bacteria*,) which live on it. The inner or center cell containing the starch is thereby liberated. Its buoyancy is so great it floats the starch in the water. All starch in perfect cells is, therefore, washed away in the manufacture.

Fig. 25.

M. Payen, as early as 1846, in a paper read by him before the Paris Academy of Sciences, stated that the starch of potatoes affected of fungi is not injured, and during the present year Dr. Hooker, of the Kew Gardens, London, has, after a microscopic examination, made a public statement to the same effect. Starch manufacturers, on the other hand, have stated in the columns of the English scientific monthlies that, while they do not deny the statements of these scientists, they affirm that a large portion of the starch of rotting potatoes will not sink, and is consequently washed away. These microscopic observations explain the discrepancy between the savans and the practical manufacturers. To overcome this difficulty, I placed a portion of the rotting potato in a muller, and ground it into a very fine pulp. I next placed the pulp into water. After twenty-four hours I examined microscopically the precipitate and the whitish matter floating in the column of water. I found the whitish substance to be cellulose, or broken cells, while the precipitate was pure starch, showing that the starch had escaped from the cells by the extra friction. In order, then, to save all the starch of rotting potatoes, it is only necessary to grind them with such improved machinery as will reduce the potatoes to a finer pulp. Martin McKinzie, of Boston, wrote to the Department, under date November 1, ultimo, stating that, in a field near his residence, Early Rose and Jackson White potatoes were planted this last season adjoining each other; the first, Early Rose, proved nearly an entire failure from blight—fungus; while the second, or Jackson Whites, grew to perfection. Not the slightest appearance of blight was manifest in any instance on them. The writer further

Fig. 26.



states that the conditions of planting, manuring, and soil were practically the same in each case. Facts similar to these have frequently been made from time to time, and form an important point for investigation, and conclusively show that the condition of the potato itself has as much to do with the rot as the fungus, *Botrytus infestans*. It has been frequently stated "that the potato, from high cultivation, has run out, and that recourse should be had to the seed of the plant as a means of renewing the crop." The terms, "high cultivation," if they have any practical meaning, must signify that an internal organic structural change has taken place. It may be that the vascular bundles occupy a larger space in the highly-cultivated potato, so called, than they did when they first became an object of public interest; if so, this alone might in part explain one of the great causes of potato-rot. The fact that the disease in the potato-plant always appears first in the vicinity of the vascular bundles, or air-cells, would seem to fortify this idea, and investigations in this line might prove profitable.

An abundance of moisture and heat will produce rank growth. The first structure formed is cellular, which includes the vascular bundles or air passages, and other forms of cellular tissue. Nitrogenous cells next follow, as a lining to cellulose cells, and, in the case of the potato within this cell, again forms a second cellulose cell, which becomes the starch-cell, and the more likely is this the mode of action, from the fact that starch may be made from the nitrogenous matters, while from the former the latter cannot be made. It is self-evident that the Jackson Whites, in the case alluded to, were proof against the attacks of fungi, although surrounded by it, and the inference might be drawn that the Jackson Whites seed was in a more favorable condition when planted than was the Early Rose seed, and hence the assimilations of the plant were not retarded. Still, the unfavorable climatic conditions under which they grew would change in some degree the relative organic internal structure. After several such changes were effected under the conditions stated, viz, extraneous moisture and high temperature, the Jackson Whites would probably be as liable to disease as the other variety. Seed will not come to perfect maturity under adverse conditions, especially plants that are very susceptible to climatic changes. Seed of the same stock, attaining its perfect development under more favorable conditions of sun heat and moisture, all other conditions being equal, would probably give much more favorable results, changing probably the relative proportions of the vascular bundle, &c., to the parenchyma cells. Judging from analogy, I am of opinion that more attention should be paid to the climatic conditions under which the seed was produced. Selections of seed made for a series of years from favorable climatic districts would have a great tendency to produce that healthy form of tuber desired for seed purposes. The savans of Europe, according to the English monthlies, have nothing better to offer as a remedy but the cutting off the stalks the moment the brown blotches appear. The climate of Great Britain and Ireland, as a rule, is very unfavorable for the growing of tubers from seed. The climate is frequently extremely moist. *Botrytus infestans* on potato fungus is always present in damp places, living on weeds, &c.; its constant presence is well known to micologists. Notwithstanding that *Botrytus infestans* is truly parisitic, its ravages are modified by climatic conditions.

FACTS FROM VARIOUS SOURCES.

AGRICULTURAL EXHIBITION IN NEW SOUTH WALES.—The Agricultural Society of New South Wales proposes to hold a Metropolitan International Exhibition in the Exhibition Building and Prince Alfred Park, Sydney, commencing April 22, and closing about 3d of May, 1873. The council having charge of this exhibition most cordially solicits agriculturists and manufacturers of every class in the United States—especially of every description of machinery and agricultural implements—to contribute specimens to the exhibition, with the view of opening with that colony a valuable market for the sale of the various manufactures of this country, which stand deservedly high in that interesting and thriving colony, to which, with the Australian and adjacent colonies, it is predicted a large and most profitable trade will soon be opened, owing to the fact that our facilities for reaching those markets are much greater than those of any other country, shipments being made from San Francisco direct, either by sailing-vessels or steamships, at least once in each month. Awards will be made to exhibitors, solely on the merits of their articles, without regard to the country from which they came. The Department has been favored by Mr. Jules Joubert, secretary of the society, with schedules of prizes, which are unusually liberal.

MILK PRODUCT OF AN AYRSHIRE DAIRY.—E. T. Miles, of Maplewood farm, Worcester county, Massachusetts, furnishes for publication the following statistics relative to the entire dairy of Ayrshires he has kept for the three years ended July 1, 1872:

	Age, July 1, 1872.	Weight, March 1, 1872.	Number of days in milk.			Weight of milk in pounds.		
			1869–'70.	1870–'71.	1871–'72.	1869–'70.	1870–'71.	1871–'72.
Miller 2d	13	1,110	284	279	288	6,588¼	4,787	5,602¾
Beauty	11	985	315	365	298	8,011	7,922½	7,555½
Emma	11	1,070	284	307	280	5,841	5,930	4,248½
Daisy	11	1,125	321	278	263	6,953	5,951	5,614½
Daisy	10	1,028	313	304	302	6,618	6,145½	6,309½
Myrtle 1st	5	995	265	267	288	4,819	5,950½	7,047
Cleopatra	5	1,085	301	309	324	5,178	6,021½	5,764½
Maud Muller	5	1,200	.....	.....	295	.....	.....	5,493
Lady Burns	5	1,073	163	307	284	3,190	5,102¼	4,785
Ellen Douglas	4	848	.....	166	267	.....	3,281	5,313½
Myrtle 2d	3	973	.....	.....	114	.....	.....	2,352¾

The largest product was by Beauty, in 1869–'70, being 8,011 pounds, or, reckoning 8¾ pounds to the gallon, 915.54 gallons; averaging for the 315 days she was in milk, 25.43 pounds, or 11.6 quarts, per day. The smallest product was by Myrtle 2d, (three years old,) in 1871–'2, being 2,352¾ pounds, or 269 gallons; averaging, for the 114 days she was in milk, 20.64 pounds, or very nearly 9½ quarts per day. It is worthy of notice that Beauty was only 12 pounds heavier than this heifer, and that there was but one other in the lot lighter than she. In 1871–'72 the total yield of the 11 cows was 56,164¼ pounds, or 6,418.9 gallons; average per cow, 5,105.9 pounds, or 583.5 gallons; average season in milk, 273 days; daily average for each cow, 15 pounds, or a little less than 6.9 quarts.

This is at the rate of 13.97 pounds per week in June; 11.76 pounds in July; and 9.52 pounds in August.

COMPARATIVE AMOUNT OF CREAM FROM DEEP OR SHALLOW SETTING OF MILK.—Thomas Edge, of Chester County, Pennsylvania, has made the following experiment: After mixing milk, the quantity not stated, so as to have it homogeneous, he divided it into two equal parts, putting as much in one can, 12 inches in diameter, 20 inches deep, as in 6 shallow pans. He added three pints of water to each can, and a half pint to each pan, and put the cans and pans into cold spring-water, so that the surface of milk in each was level with the surface of water. The skimmings of cans and pans on six successive days were done at the same time. The daily amounts, as given, make the total of cream from the cans, 68 pounds; from the pans, 48⅞ pounds; showing an excess of 19⅛ pounds, or a fraction over 39 per cent. of gain over the pans, though the experimenter states, not in accordance with his other figures, that the excess was 18⅝ pounds. These two lots of cream being churned on the same morning, that from the cans yielded 14 ounces more butter than that from the pans; the respective quantities of butter are not given. During the experiment he noticed that the cream from the cans was less solid and tenacious, more easily strained, and thickened less after straining, than that from the pans; also, that if both lots were not skimmed till the pans were ready, that in the cans soured and sometimes thickened, and no more cream rose after skimming; but if both were skimmed when the cans were ready, a small amount of cream would subsequently rise in the pans. On the other hand, members of the Solebury Farmers' Club, Bucks County, Pennsylvania, made experiments, in which the difference in depth was much less, with the following results, Henry Wildman, beginning June 3, mixed and divided into two equal parts the milk of fourteen milkings, the aggregate weight of which was 555 pounds. One-half was set 6, the other 2½ inches deep. The cream from the deep set made 12 pounds 8 ounces of butter; from the shallow set, 13 pounds 3 ounces, a difference of 11 ounces in favor of the latter. The temperature and other particulars affecting the result are not stated.

During the week following May 27, E. Reeder put, each morning, 24 pounds of milk into two pans 4 inches deep, and 24 into four pans 2½ inches deep; each evening, 35 pounds into three pans 4 inches deep, and 36 into six pans 2½ inches deep, making a total of 840 pounds. The temperature of the milk-room, carefully noted, ranged from 56° to 60°, and the milk stood forty-eight hours before skimming. From the deep-set, 43 pounds of cream were obtained; from the shallow-set, 46 pounds. The time required for churning the cream, put into the churn at a temperature of 56°, was 18 minutes for that from the deep-set and 17 for that from the shallow-set. The butter obtained from the former weighed in the lump, 19 pounds; from the latter, 21 pounds; after being worked and formed into pound-prints, that from the former weighed 16 pounds and 12 ounces; that from the latter, 18 pounds and 9 ounces; a difference of 1 pound and 13 ounces in favor of the latter. The milk was the mixed product of 5 cows, and the butter averaged 1 pound for every 24 of milk.

E. Michener states that he "set four milkings 5 inches deep and 3 inches," and obtained from the deep-set 6½ pounds of butter; from the shallow-set, 7 pounds, but gives no further particulars, except the statement that his family considered shallow-setting less trouble than deep.

THE TWO SYSTEMS OF AGRICULTURE AT THE SOUTH.

A careful observer reports the following facts respecting two intelligent, enterprising planters in the same locality in Louisiana: They

were possessed of equivalent fortunes, and of plantations about equal in size and productiveness before the war. At its close, both were stripped of everything except their desolated lands. One of these planters fully appreciated the necessity of adapting himself to the new order of things. Recognizing it as his first duty to provide for the immediate wants of his family, and remembering that his neighbors who were exclusively occupied in raising cotton must have food for their families and hands, he gave his first attention to the raising of products for home consumption—corn, potatoes, garden vegetables, orchard, and small fruits; clover for stock and food for swine. Cotton and rice had a place in this diversified agriculture, but they were made subordinate to those products which every family must have for the table. Beginning in this way, on a small scale, he could avoid a great debt, and its consuming canker of interest; get along with a small amount of help, and have constant and remunerative employment for that; secure his family a comfortable support independently of prices in the market, and be sure of a ready sale for whatever surplus he raised. Year by year he has made steady upward progress; his fruit trees have come more and more into bearing; his clover-fields have been extending; and his means for increasing the productiveness of his lands have been multiplying. To-day, if he has not more wealth, his family have more comforts and luxuries, he has more ready money, and is more independent than before the war. The other could not overcome his attachment to the old system of exclusive cotton-planting, but has steadily adhered to it. "In fact, he has taken up his vegetable-garden with the adored staple." This plan necessitated the contraction of a large debt, with its accumulating interest, from the very beginning. This has grown as steadily as his neighbor's gains, and the probability is that his now heavily mortgaged plantation must pass out of his hands before another season.

Need of diversified industry.—Mr. H. D. Clayton, president of an agricultural society at Clayton, Alabama, reports that in that section cotton has hitherto been almost the only agricultural product. A few "scrubby" cattle are raised, but of the stock, horses, sheep, and hogs, possessed by the owners of the soil, 99 per cent. are bought elsewhere. Convinced that greater profit, and much greater independence of the ravages of insects, of the vicissitudes of the season, and of commerce, would result from raising a variety of agricultural products instead of cotton alone, he is endeavoring to introduce a change to that effect.

Conditions of Success in Cotton Culture.—A correspondent in Jefferson County, Arkansas, who has been "a cotton-grower for thirty years," furnishes some valuable hints respecting that branch of husbandry. Having had, this season, an opportunity to examine extensively fields of growing cotton in Tennessee and Northern Alabama, as well as in his own section, he reports "*fair crops where the land was well cultivated*, and indifferent ones where it was not." In the latter case the long-continued drought and intense heat of the season greatly injured the crop in two ways: first, the roots did not strike down deep, but grew near the surface; and, second, the slender growth occasioned by shallow and poor cultivation left the surface more exposed to the heat of the sun. The well-cultivated fields had deeper and more vigorous roots, and the surface was better shaded. There has been much defective cultivation, he represents, for the reason that the freedmen, who have done the work, have been compelled to use poor teams and plows, for the want of means to buy better ones. This is one among many illustrations which show, directly or indirectly, that every degree of improvement in the condition of the laboring class will result in advantage

to their employers, not less than to themselves. The drought caused the picking to be earlier than in an ordinary season, and hence the new crop begins to arrive at the receiving ports earlier—a fact by which merchants at a distance are liable to be misled, since in seasons free from drought, which make cotton through August, early receipts are indicative of a large yield. On the other hand, in estimating the amount of the crop, it should be remembered that in dry seasons like this, 100 pounds of seed-cotton will gin more lint than in an ordinary season, because the seed is lighter. Our correspondent concludes as follows:

The information, respecting the cotton crop, gathered by the Department of Agriculture is becoming reliable, and therefore valuable to the planters. The seed most valuable to growers is that of the finest variety of multiboll cotton. The fairs ought to offer premiums for cotton-stalks with the bolls on them and the cotton in the bolls, not for clean cotton in the bale. The latter indicates nothing but "pains taking," which may be done by any one, and a premium for it results in no benefit to agriculture. But the seed of a fine variety of cotton is to cotton-growing what the importation of fine stallions or bulls is to stock-raising. They may improve all the stock of the State and their offspring become immensely valuable. Our reliable cotton-belt is between 32° 30' and 35°. This belt grows the short-staple and the bulk of our crop. The long-staple crop with us is very small. Asia and Africa have cotton climates, but not the seasons and the intelligence. Egypt grows a good quality of what we may call long-staple, but not equal to our islands off the coast of Georgia. We have the finest cotton country in the world, and are the most intelligent people who grow cotton. We must, therefore, make our own seed. It cannot come from anywhere else. Our best multiboll seed must be produced in our own fields. Selections and crossings continued long enough will secure the desired result. Hence the propriety of offering premiums for *seed* at our fairs.

AN ACTIVE FARMERS' CLUB.—The Concord (Massachusetts) Farmers' Club now numbers thirty active members, nearly all of whom are directly engaged in farming. The club holds weekly meetings at the houses of the members, a subject for discussion being assigned for each meeting. The following is a list of the subjects to be discussed, in the order named, during the coming winter:

Wool and mutton—can they be grown profitably by Concord farmers? marketing and care of milk; potato crop; pastures; resources of the farm in fertilizing material; alternation of crops reduced to a system; milk—how much does it cost to make a can in summer and winter? farming to-day compared with twenty years ago; insects; position of the American farmer; means for improving the soil, and the best method of composting manures; care of milch cows, and best method of feeding; crops of 1872 compared with former years, and their money-value; hay and its substitutes; best method of curing and feeding; theory and practice of agriculture; a summer's experience in gardening; soils, variety, and to what best adapted; advantages of a country home; asparagus; trees of Concord, indigenous and introduced; thunder-showers; history of agriculture; roots—best method of raising them, and their value for feed and market; improvement in houses.

FARMERS' CLUBS IN NOVA SCOTIA.—An act has been passed by the provincial legislature of Nova Scotia for promoting the formation of farmers' clubs thoughout that province. The board of agriculture of the province has for the purposes of the act been constituted a bureau of agriculture, and has been authorized to establish societies, to be called farmers' clubs, in all the different counties of Nova Scotia. The clubs are required to prepare statistics in all the branches of agricultural and horticultural industry in their several counties, and to publish, in such manner as to secure the widest circulation, all such reports, essays, and other information as they may procure and adjudge suitable for publication. The bureau is to prepare papers from time to time for the consideration of clubs, embracing such subjects as drainage, fertilizers, improvement of swamp-lands, rotation of crops, lands best adapted for cereals, improvement of stock, &c. Premiums are to be offered for essays on questions of scientific inquiry relating to agriculture and horticulture; on

the raising and improvement of stock, on improvements in agricultural implements and machines; and generally for excellence in any branch of agricultural, horticultural, or floral industry; and the bureau is annually to epitomize the results arrived at in the various discussions before the clubs, and cause the same to be published for general sale and distribution.

AGRICULTURAL PRODUCTION IN AUSTRALIA.—The official reports of Australia make the aggregate area of land under tillage, for the year ending March 31, 1872, 937,229 acres; an increase of 28,205 acres over the previous year. The amount of wheat produced is stated at 4,500,795 bushels; oats, 3,299,889; barley, 335,596; maize, 30,833; beans, millet, and sorghum, 173,217; rye, &c., 8,496; green crops, exclusive of those in kitchen and market gardens, 159,093; hay, 144,637 tons. Total product of grain, 8,348,736 bushels, being an increase over the previous year of 2,892,159 bushels. Average yield of wheat per acre, 13.45 bushels; oats, 18.76; hay, 1.4 tons. The yield of wheat in the entire colony for the last ten years is given as follows:

Year ending March 31.	Area in acres.	Gross product in bushels.	Average of bushels per acre.
1863	162,009	3,008,487	18.6
1864	149,392	1,338,762	9.
1865	125,040	1,899,378	15.2
1866	178,628	3,514,227	19.7
1867	208,588	4,641,205	22.3
1868	216,989	3,411,663	15.7
1869	259,804	4,229,228	16.3
1870	288,514	5,697,056	19.8
1871	284,167	2,870,409	10.1
1872	334,609	4,500,795	13.45

The above gives an average product per acre for the ten years of 15.9 bushels.

FOREIGN GRAPES IN TEXAS.—A correspondent of the Department in Austin, Texas, states that since the war the attention of agriculturists in that State has been largely directed to the culture of the grape and other fruits. For a number of years, he says, experience has shown beyond a doubt that the climate of Texas is very favorable to the culture of the foreign grapes. A number of varieties are under cultivation, and have produced very fine fruit, even in years when the native grape has been killed by late spring frosts.

HAY IN TEXAS.—A correspondent of the Department in Millheim County, Texas, writes us that hay in large quantities has been harvested in that county the past season, which will be of great service the coming winter, the prairie pastures having been almost destroyed by the drought.

THE LUMBER-TRADE OF FLORIDA.—It is reported that the number of vessels freighted at Pensacola with timber for European ports in the year ending October 1, was one hundred and sixty-six, with an aggregate tonnage of 139,081; the total of cubic feet thus exported was, of hewn timber, 5,790,072; sawn, 1,500,029. The corresponding statistics for the year preceding were one hundred and fourteen vessels, with a tonnage of 95,439, and a total in cubic feet of hewn timber, 4,063,327; sawn, 1,057,455. The total of feet cleared for American ports in the year

ending October 1, was 45,953,374. Of these 9,303,706 were shipped to Boston, 6,474,343 to New York, and 3,651,547 to Philadelphia. A prosperous though less extensive lumber-trade has also been carried on the past year at Jacksonville, Fernandina, and some other points.

THOROUGH-BRED STOCK IN NOVA SCOTIA.—The friends of agriculture and the public authorities in Nova Scotia are making a laudable effort to encourage the more general diffusion of thorough-bred stock throughout that province. The board of agriculture, under the authority of the provincial legislature, have imported a number of entire English draught-horses, Short-horn, Ayrshire, and Devon bulls, bull calves, and cows, and Cotswold, Leicester, Shropshire, and Southdown rams and ewes, which were offered for sale at public auction at Halifax on a recent occasion, under the restriction that the animals were to be kept in the province for breeding purposes. The idea of improving the stock of the country by importing pure breeds and selling them at auction is borrowed from the Belgians, who have long been in the habit, under the countenance and direct support of the government, of importing Durham bulls and heifers, and disposing of them by public sale in the different provinces of the kingdom.

FLUKE IN SHEEP.—The disease known in common parlance as "the fluke," from the popular name applied to the entozoa found in the livers of those afflicted, is prevailing to an alarming degree in Australia. In consequence of the reticence of stock-owners on the subject the extent of the malady is not stated; but it is no secret that one large stock-owner, out of 44,000 sheep, has lost 30,000 the past year, and that a flock of 3,000 flukey ewes produced only 90 lambs. Through the unwillingness of stock-owners to investigate the matter and seek for a remedy, the disease has spread unchecked, until in some parts of the colony it is said to be difficult to find a sound sheep for the butcher. In portions of the New South Wales back country, where the negroes occasionally steal a sheep and feast upon it when half raw, it is said to be no uncommon occurrence to find the natives dying of fluke. In Tasmania the disease is likewise very fatally prevalent.

EXPERIMENT IN PLOWING BY STEAM-POWER.—On the 8th of November, on the seed-farm of D. Landreth, at Bloomsdale, near Bristol, Bucks County, Pennsylvania, a trial was made of the "Williamson road and field steamer," under the supervision of the inventor, D. D. Williamson, of New York. The experiment is reported as entirely successful. Mr. Williamson's invention is an improvement on the "Thompson road-steamer" of Great Britain, consisting mainly in the attachment of vulcanized-rubber tires in such a way as to prevent the wheels from sinking in soft soil, or compressing it to an injurious degree. The report represents that the steamer consumes about one ton of coal per day; requires for working it an engineer, fireman, and "a boy to drive a water-cart;" can be used for driving thrashing and other machines; will draw from twenty to thirty tons of freight in wagons on any fair country road; will turn on a space not exceeding in diameter its own length; will plow, on land suitable for cultivation by steam, from one to three acres per hour, according to length of land and depth of furrow; and costs, with plow and tackle complete, $5,000. The following extracts are from a description of its action by an eye-witness:

No team of horses could have turned, backed, and stopped with more facility and certainty. It was run up the steep bridgeway of a barn, having an elevation of 1 foot in 5, backed down, and run up again with the greatest ease and facility. For a further confirmation of its capacity a couple of large farm-wagons were coupled behind it, in which about twenty of the guests were seated for a ride. It trotted off with us on the public road toward Bristol, at the rate of six to seven miles per hour; went through

gates, turned in at bars, crossed soft gullies, went up sharp hillocks, crossed at a sharp elevation the railroad-track, and down again on the other side, and, making a short turn, brought us back through a field of fifty acres, which had been plowed with it, to the place of departure. This plowing was beautifully done, and we were informed at an average depth of 9 inches, much of it being 12 inches. No more accurate or level furrows, as it appeared to us, could be made by any plowman with a well-trained team of horses.

After being uncoupled from the wagons it was attached for a trial of plowing to the Williamson gang-plow, consisting of five secured to one frame. * * * * On the way to the field the plows followed the steamer as erected as a two-wheeled cart. Not a moment was lost in getting to work. The field selected was an old tough sod with a steep grade in the center. The tripping of a lever by the fireman, which he performed from his station at the boiler, let the plows into the ground, and away rolled the steamer as straight as an arrow, with the tough sod-furrows rolling over behind like so many wavés. The work seemed perfect, each furrow being mechanically correct and alike in width and depth. At the ascent of the grade in the middle of the field, no diminished speed was observable, the power seeming so arbitrary and irresistible that no ordinary field obstructions could have resisted its continuous progress. Arrived at the end of the field, the fireman pulled another rope, and out shot each one of the plows, the steamer spun around on one wheel, ran across the headland, and turning into a new land, was instantly at work on the "turn-bout." There was no hitch, no slipping or backing, but a simple, silent triumph of good, sensible engineering. We are thus particular in describing exactly what we saw and was witnessed with surprise and pleasure by the whole company, because it *demonstrated* that the experiment of steam on the farm and on the road was successful in every point.

METEOROLOGY IN AGRICULTURE.—The powers of the Signal-Office have been enlarged by the act of Congress of June 10, 1872, and extended to the more immediate interests of agriculture. Appropriation is made by that act for the expenses of storm-signals, by telegraph, announcing the probable approach and force of storms throughout the United States, for the benefit of agriculture as well as of commerce. To aid in the accomplishment of the object, the Chief Signal-Officer has issued a circular to agricultural and horticultural societies, inviting any suggestions or recommendations to perfect the system now established, and to render it more directly useful to the agricultural interests, and suggesting that the best mode in which such societies can co-operate with the Signal-Office in the matter is by the appointment of permanent committees to confer occasionally with the Chief Signal-Officer, and to take, in conjunction with him, such steps as may be deemed desirable. A large number of societies have already responded to the request of the Signal Officer, and appointed the committees as proposed. It is not to be understood that these committees are to take meteorological observations or make reports for the signal-service, the only object being to obtain their practical co-operation through correspondence and conference.

DESTRUCTION OF COTTON BY FLOOD.—Our correspondent in Mobile County, Alabama, reports that a recent flood has been very destructive to cotton, the principal agricultural product of that county. Is is estimated that it destroyed from 500,000 to 600,000 bales, which would otherwise have been shipped from Mobile. The falling off thus occasioned is so great as to somewhat cripple the commerce of that port.

AGRICULTURE IN ALAMEDA COUNTY, CALIFORNIA.—This is a small county lying east of San Francisco Bay, and having a population of about 55,000, with 6,474 registered voters. The present assessed value of its real estate is $27,486,940; of its improvements, $5,498,020; of its personal property, $6,748,665. In 1871 it had of land inclosed 94,790 acres; cultivated, 124,546 acres; upon which were produced, bushels of wheat, 429,443; barley, 204,580; oats, 29,947; rye, 300; corn, 23,485; buckwheat, 789; peas, 2,925; beans, 3,110; onions, 36,400; tons of potatoes, 9,022; beets, 870; turnips, 115; pumpkins and squashes, 594; hay, 8,875; pounds of flax, 13,500; hops, 6,500; wool, 247,840; butter,

226,250; honey, 750. In 1872 it had under cultivation, of wheat, 115,108 acres; barley, 67,837; oats, 858; potatoes, 968; total under these four products, 185,071 acres, being 60,525 more than were occupied by all the grain and vegetable products cultivated the previous year. In cultivated trees it has of apple, 50,514; peach, 13,520; pear, 16,164; plum, 11,858; cherry, 28,519; nectarine, 3,300; quince, 1,468; apricot, 3,427; fig, 817; lemon, 62; orange, 82; olive, 587; prune, 3,066; mulberry, 1,204; almond, 152,956; walnut, 3,576; grape-vines, 223,102. In live stock it has, of cattle, 22,528; horses, 6,711; mules, 631; asses, 14; sheep, 38,369; Cashmere and Angora goats, 46; hogs, 2,556; hives of bees, 300.

Cork-oak.—A correspondent, dating at Alhambra, California, reports that the acorns of the cork-oak, distributed by this Department a few years since, have done well, and expresses the opinion that a new supply would be carefully improved in view of prospective profitable results.

The rice crop.—Lafourche, one of the principal rice-growing parishes of Louisiana, has produced this season, as reported, about 15,000 bushels of clean rice. This is about equal to the crop of the same parish in 1869.

Honey in Colorado.—It is reported that two years ago Mr. N. O Stewart, of Jefferson County, started with two hives of bees, which have now increased to 21 hives, and have yielded the past season about 2,500 pounds of honey, worth from 40 to 50 cents per pound. Mr. Stewart has never fed his bees, and they have cost him little or no attention.

Product of one kernel of wheat.—Our correspondent in Meriwether County, Georgia, states that a "volunteer" kernel of wheat, which came up in the garden of Hon. O. Warner, this season, produced 99 heads and 3,058 kernels, the largest heads having 75 each. It was an early red, bald variety, and matured about the 1st of June.

Winter and spring wheat in Wisconsin.—A correspondent in Sauk County represents that the Diehl wheat (winter) received from this Department has proved hardy and productive, yielding on new ground 40¾ bushels, and on old 25. It is so well appreciated that he readily sold his whole crop at $2 per bushel for seed. He believes that henceforth Wisconsin, in part at least, must raise hardy varieties of winter, instead of spring wheat, and must keep the soil in good condition by the use of fertilizers. Many hope to obviate the failure in raising spring-wheat by a change of seed from one locality to another, but he is convinced that the difficulty is too radical to be remedied in that way: that it results from exhaustion of soil by continuous cropping, regardless of the laws of compensation.

Farm-animals in Ohio.—The official report for 1872 gives the total of farm-animals in Ohio, compared with year 1871, as follows: In 1871, number of horses, 711,349; cattle, 1,646,440; mules, &c., 21,986; sheep, 4,302,904; hogs, 2,164,403. In 1872, number of horses, 718,157; cattle, 1,761,623; mules, &c., 22,958; sheep, 4,464,898; hogs, 2,315,554. Increase of horses, 6,808; cattle, 115,183; mules, &c., 972; sheep, 161,994; hogs, 151,151.

Cultivation of corn.—Shoemaker & Robinson, of West Whiteland, Chester County, Pennsylvania, claim to have produced, the present year, on 10 acres and 92 perches of land, 1,005 bushels of corn, allowing 70 pounds of ears to the bushel; 70 pounds were shelled, and it made one bushel and two quarts. During the summer of 1871, the field was

limed at the rate of 60 bushels to the acre. In the winter of 1872–'72 it was well covered with barn-yard manure, which was plowed under in April, scored about 4 feet scant each way, and planted with three grains and compost in each hill, in the first week in May.

CATTLE-PLAGUE IN FRANCE.—The cattle typhus or plague is represented as having almost entirely disappeared in France, after having cost the country at least 57,000 head of cattle, approximately estimated at 15,000,000 francs, or $3,000,000, the average value of each beast victimized being 266 francs. Forty departments, including about one-half of the territory of the country, suffered from the disease.

COLUMBIA COUNTY, NEW YORK.—Lying in the valley of the Hudson, with ready access to market, and possessing varieties of soil which adapt it to the production of all kinds of grain, vegetables, and fruit, Columbia County ought to be among the first in agricultural progress and prosperity. As yet, few advances have been made upon old methods, but subsoiling, underdraining, and kindred improvements are beginning to engage the attention of farmers, agricultural journals are spreading among them, and there are other indications that the era of progress is at hand.

TREE-CULTURE IN KANSAS.—Willow-cuttings received from this Department, and set last spring by the Kansas State Agricultural College at Manhattan, Riley County, are reported as having been measured, October 15, with the following results: Height of *Salix babylonica*, 8½ feet; *S. japonica*, 6½ feet; *S. acutifolia*, 6 feet; *S. moschata*, 5 feet. There were other cuttings from the Department, but the above were the most thrifty. Lombardy poplars, from cuttings set last spring, were 6 feet high. Among upland willows the *Salix triandra* (from the Department) had grown over 4 feet. On the whole, the results of experiments with forest-trees at the agricultural college are reported as highly satisfactory. A correspondent in Linn County also reports very favorable results from seeds of ailantus and honey-locust trees received from this Department. The plants are represented as very thrifty; also as growing twice as rapidly in red as in "a very rich black soil."

FARMING IN LOUISIANA.—An occasional correspondent, writing from Morehouse Parish, represents that, in that section, the present generation of laborers will not realize that the land now needs different and more thorough cultivation than when new; and so are likely to go on, to the end of life, "making corn and cotton, just as old masters did when they were young." This season, on a place which he superintended, he made, from 150 acres planted in cotton, 175 bales; but other places worked by him, to which he could not give personal supervision, did not yield half as well. He reports that in that section cotton, now housed, turns out better than was anticipated, and corn enough has been raised to supply their own wants. He adds:

> I and two others cut hay last spring, on a prairie above here, (Bayou Bartholomew,) which is very fine. We had the first mower ever brought into North Louisiana. I suppose we cut 100 tons. There is enough on the prairie to supply the rough forage for the whole parish. It contains 5,000 acres or more, covered with grass from knee high to as high as the head of a man on horseback.

WHEAT-EXPORT OF CALIFORNIA.—The exports of California wheat, from the first arrivals of the new crop to December 1, amounted to five and a half million centals, or over nine million bushels, freighting nearly 150 ships. A score of vessels, at San Francisco, were awaiting cargo, and the daily shipments averaged 1,000 tons. But small inroads, however, had been made upon the inland accumulations of grain. Flour

shipments, this fall, have been quite limited, being confined mostly to a few thousand barrels of low-priced superfines sent by steamer to Hong-Kong.

FLUCTUATIONS IN THE PRICES OF SHEEP AND LAMBS.—The Mark Lane Express gives a table showing the range of prices for sheep and lambs sold at the Lewes sheep fair, England, for the years 1840–'50–'55, and from 1859 to 1872 inclusive. The highest price is for this year, ranging from 40 to 72 shillings for sheep, and from 26 to 48 for lambs. The largest for sheep was in 1850, being from 20 to 35, lambs ranging from 15 to 25; but in 1868 the latter ranged from 14 to 26, sheep selling at 20 to 41. For the whole period the average price was, for sheep 38*s.* 6*d.*, for lambs 26*s.*, the extremes of annual averages being, as above, for sheep 56*s.* and 27*s.* 6*d.*, and for lambs 37*s.* and 20*s.*

DISEASES OF SHEEP IN OREGON.—A correspondent in Lane County writes as follows:

> Our sheep, in Oregon, have new, and, to me, strange diseases. One, here called "leeches in the liver," is prevalent and fatal. The liver is filled with leeches, resembling those found in water, which appear to be at home in sheep, deer, and cattle. Thousands of sheep die annually in our State from their presence. Symptoms: The sheep become stupid, look sorry, fall away in flesh, the head swells about the nose, and the skin of the jaw hangs down like a sack or bladder filled with water. "Staggers," another disease which I have not found in the books, is attended with the following symptoms: The sheep begins to shake its head, and scratch its ear with its hind foot; subsequently it goes round and round, falls down, gets up, falls again and again, looks wildly out of the eyes, and seems to be on a "regular bender" for one and sometimes for four or five days. I am told that sometimes sheep die of "staggers," but cannot vouch for the statement. Can any of your correspondents point out the proper names and remedies of these diseases?

SUCCESS IN GROWING SILKWORMS.—The experiment of Mr. Romulus Bonhomme in growing silkworms, at Los Angeles, California, the past season, is reported as very successful. The mulberry trees used are of the alba and moretta varieties, of which he has 16,000 trees, four and five years old. He has tried the Philippine, which he regards as nearly equal to the alba, and the multicaulis, which he has abandoned as comparatively worthless. He sets his trees in rows 16 feet apart both ways; has tried 8 feet, but finds that too near, the leaves of trees so crowded not being healthy for worms. From four ounces of eggs he obtained 445 pounds of cocoons. His loss of worms was less than 1 per cent. of the number hatched. During the first and second stages of growth he feeds from young trees; the third and fourth, from older trees and leaves. During the first three stages he feeds three times a day; during the fourth, five times a day and twice at night. He finds that the worms from one ounce of eggs require, to perfect their growth, 1,200 pounds of leaves, while in Italy and France the same quantity requires from 1,800 to 2,600 pounds. He began feeding the French yellow variety on the 15th of April, and the cocoons were completed in thirty-six to forty days. As his object was the production of eggs, his cocoons are all perforated. The eggs, of which he has 400 ounces in excellent condition, are estimated at $6 per ounce. He is confident that for the successful culture of the silkworm, the climate of Los Angeles is nowhere surpassed.

BEET-SUGAR IN CALIFORNIA.—The Alvarado beet crop of 1870 yielded less than 8 per cent. of sugar, the whole amount being 500,000 pounds; that of 1871 yielded about 8 per cent., and amounted to 750,000 pounds; that of 1872 yields 8½ per cent., and it is estimated that the whole product of sugar will be from 1,000,000 to 1,250,000 pounds. It is reported that the home product, as yet in its infancy, has already

had the effect to reduce the price of No. 1 granulated sugar in California 1½ to 2 cents per pound, and to make it 1 cent per pound lower, on the average, than in the New York market.

CHEESE-MAKING IN TEXAS.—A Mr. Brown, who emigrated from Jefferson County, New York, to Erath County, Texas, began there experiments in cheese-making, in 1869. With rude apparatus, he made, from 35 common Texas range cows, 1,000 pounds; lost 700 pounds of it, and sold the rest for 35 cents per pound. With better apparatus, obtained from the North in 1870, he made, from 40 cows of the same grade, 2,000 pounds, and lost about 300. Inferring that the loss was not owing to climate, cows, or feed, but to improper management of the business in that untried climate, he improved the winter following in gaining information from the best authorities on cheese-making; procured Bavarian prepared rennet, and last season tried again, and with very satisfactory results, not losing 10 pounds. He estimates that with good management an ordinary Texas cow will make, during the season, 100 pounds of cheese, besides rearing a calf, and that at least $40 worth of pork may be raised on the whey from her milk, properly fed out.

AGRICULTURE IN IDAHO.—Mr. J. H. Evans, Lewiston, Idaho, writes to this Department, under date of October 11, that it was thought until the last few years that mining was the only pursuit that would pay in that upper country; but that the last three years have developed the fact that there is a vast agricultural country along the table-lands and valleys of the Blue and Cœur d'Alêne Mountains.

A brief description of the Genesee Valley, in about the latitude of 46°, will apply in most respects to numberless others. This valley is ten miles from Lewiston, the capital of Nez Perce County, at the confluence of the Kooskooskie with the Lewis and Clark branch of the Columbia River, and is some fourteen miles long, and from half to one mile wide. The soil is a vegetable mold, slightly intermixed with sand, from two to three feet deep, resting upon a clay subsoil. Water, during the dryest part of the year, is found at the depth of 12 to 16 feet, pure and cold, while along the smaller valleys intersecting the Genesee are to be found numberless springs. Timber consists of pine, fir, tamarack, and cedar, and is inexhaustible. The hills are covered with the finest bunch-grass, which has remained green and tender all summer, upon which cattle and horses thrive as well as upon any of the tame grasses. Stock-raising is destined to be one of the leading pursuits, as the mild winters render it unnecessary to provide but a small amount of food; indeed, thousands of Indian horses and cattle go through every winter without any feed. There is only one man in many miles who had any crop the present season, and he had wheat, oats, and barley of a superior description. He also had fine vegetables of all the common kinds. There was frost every month the past summer on the low, moist land, but none on the hill-sides until the 25th of September. Apples, pears, peaches, plums and grapes, do splendidly along the Clearwater River.

NEW AGRICULTURAL SOCIETIES.—John F. Hauser, Grundy County, Tennessee, writes to this Department, under date of October 30, that the interests of agricultural progress must necessarily lead the farmers to this Department for advice and support, and that he takes pleasure in announcing the organization of the Agricultural Society of New Switzerland, composed of a Swiss colony in Grundy County, Tennessee, counting now twenty-eight members, and enjoying a healthy and flourishing condition. Heretofore, the Cumberland Mountains have been re-

garded by the native inhabitants as entirely unadapted to farming purposes, except for stock, fruit, and a few vegetables; but now this region is beginning to attract the attention of immigration, and will soon change the wild aspect into a lovely landscape of productive farms, aided by industrial and commercial enterprise. The erroneous notion of former days has been sufficiently disproved during the four years since the colony was founded. They have now to show specimens of wheat, rye, and oats, vegetables and fruits, grapes, &c., which will compare with similar products grown anywhere in the United States; and he hopes, in time, by a more practical and a better knowledge of the peculiarities of soil and climate, to surpass them. For such purpose their society was organized, and is laboring diligently.

Pure and Cheap Milk.—In London the names of those who are known to sell adulterated milk are published monthly, and, it is said, with good effect. The plan has been attempted in some of the cities of the United States, but only partially, and with very limited success. There is in London a company—the Aylesbury Dairy Company—which occupies premises covering an area of fifty acres of ground, the system being to procure and distribute milk from reliable sources and of an assured good quality, at rates which shall be reasonably remunerative to dairymen, and at the same time secure consumers against extortion from speculators, middle-men, and others. The company has been in operation long enough to have tested its practicability and beneficent effects, and it now supplies several thousand families once, twice, and, in some instances, three times a day, with pure milk. It commenced with a capital of fifty thousand dollars, but that has been increased to five hundred thousand, upon which a dividend of ten per cent. is paid. The price of milk furnished by the company has never exceeded eight cents a quart. The purity of milk may easily be determined by ascertaining the percentage of cream and solid matter which it gives. Genuine milk will average ten per cent. of cream and twelve per cent. of solid matter. A milk with less cream and solid matter than this has been skimmed or watered.

Stock Sales.—Mr. L. L. Dorsey sold, November 13th, at his stock-farm, eight miles from Louisville, Kentucky, 49 horses for $23,220, being an average of $472 per head. The range was from $3,600 for "Rolla Golddust," a gelding twelve years old, to $175 for a saddle-gelding.

Mr. Wm. Worfield, whose farm is near Lexington, Kentucky, had a large sale of short-horns, November 12th. Of the bulls sold, a list of twelve, with the prices and ages affixed, is given; six of them were calved in 1871, and six in 1872. The twelve sold for $3,350; average price, $279⅙. The six calved in 1872 sold for $1,315; average, $219⅙. The six calved in 1871, for $2,035; averaging $339⅙. The range of prices was from $650 for "Loudon Duke 8th," calved November 22, 1871, to $50 for "Wexford," calved April 8, 1872. The latter was red and white. "Jack Tar," red, calved a month later, May 10, was sold to the same purchaser, J. H. Spears of Illinois, for $505. Of the cows sold, a list of thirty-seven is given, which brought a total of $13,641; average price, $368.67. The extremes in price were, for "Loudon Duchess 6th," roan, calved December 31, 1870, $2,025, and "Laura Lee," red-roan $61.

MARKET PRICES OF FARM PRODUCTS.

For November and December, 1872.

Articles.	November.	December.
NEW YORK.		
Flour, superfine State ..... per barrel..	$5 80 to $6 20	$5 90 to $6 30
extra State ..... do.....	6 90 to 7 00	7 00 to 7 80
superfine western ..... do.....	5 80 to 6 20	5 90 to 6 30
extra to choice western ..... do.....	6 80 to 11 00	6 90 to 11 00
extra southern ..... do.....	7 10 to 9 15	7 10 to 9 15
choice southern ..... do.....	9 20 to 12 00	9 20 to 12 00
Wheat, No. 1 spring ..... per bushel..	1 64 to ———	1 60 to 1 61
No. 2 spring ..... do.....	1 58 to 1 58½	———
winter, red, western ..... do.....	1 60 to 1 63	1 63 to 1 68
white winter, western ..... do.....	1 90 to ———	1 76 to 2 05
Rye ..... do.....	85 to ———	91 to ———
Barley ..... do.....	70 to 85	90 to 92
Oats ..... do.....	38 to 50	49 to 55
Corn ..... do.....	65 to 66½	63 to 75½
Hay, shipping qualities ..... per ton...	20 00 to 21 00	22 00 to ———
prime, for retailing ..... do.....	25 00 to 30 00	28 00 to 36 00
Pork, mess ..... per barrel..	15 25 to 15 80	15 75 to 16 00
prime mess ..... do.....	15 00 to ———	15 25 to ———
Beef, plain mess ..... do.....	4 00 to 8 50	4 00 to 12 00
extra mess ..... do.....	8 50 to 10 00	12 00 to 13 50
Lard ..... per pound..	8⅛ to 8⅞	7⅞ to 8⅝
Butter, western ..... do.....	10 to 22	10 to 22
State dairy ..... do.....	24 to 35	24 to 35
Cheese, western dairy ..... do.....	12½ to 13¾	12½ to 13¾
State factory ..... do.....	12 to 15	12 to 14
Cotton, ordinary to good ordinary ..... do.....	16½ to 19⅝	16½ to 18⅞
low middling to good middl'g. do.....	19¼ to 21½	18⅝ to 21½
Tobacco, lugs, all grades ..... do.....	9¼ to 10¼	9½ to 10¼
common to medium leaf ..... do.....	10 to 11½	10 to 11¾
Wool, extra pulled ..... do.....	57½ to ———	61½ to 65
California, spring clip ..... do.....	———	———
California fall clip ..... do.....	26 to ———	33 to ———
Texas ..... do.....	24 to 38	42 to 43½
New York State fleece ..... do.....	———	———
Choice Ohio ..... do.....	———	———
BOSTON.		
Flour, western, superfine ..... per barrel..	5 25 to 6 00	5 00 to 6 00
extras ..... do.....	6 50 to 8 50	6 75 to 8 50
choice ..... do.....	8 75 to 11 50	9 00 to 11 50
southern extras ..... do.....	6 75 to 7 25	6 75 to 7 25
choice Baltimore ..... do.....	10 00 to 12 00	10 00 to 12 00
Wheat ..... per bushel..	1 60 to 2.00	1 60 to 2 00
Corn, southern yellow ..... do.....	71 to 72	72 to 73
western mixed ..... do.....	69 to 71	70 to 72
western yellow ..... do.....	71 to 72	72 to 73
Rye ..... do.....	85 to 90	1 00 to ———
Barley ..... do.....	75 to 1 10	90 to 1 20
Oats ..... do.....	40 to 56	45 to 56
Beef, western mess ..... per barrel..	11 00 to 12 00	13 00 to 15 00
western extra ..... do.....	11 00 to 12 00	11 50 to 12 00
Pork, mess ..... do.....	16 00 to 16 50	16 50 to 17 00
prime ..... do.....	12 00 to 12 50	12 50 to 13 00
Lard ..... per pound..	9 to 10	9 to 9¼
Butter, New York and Vermont ..... do.....	15 to 34	15 to 33
western ..... do.....	15 to 30	12 to 30

Market prices of farm products—Continued.

Articles.	November.	December.
BOSTON—Continued.		
Cheese, N. Y. and Vt., factory ....per pound..	$0 13 to $0 15½	$0 12 to $0 14½
New York and Vermont dairy..do.....	12½ to 15	11 to 14
Ohio factory, good to choice....do.....	12½ to 15	12 to 14½
Cotton, ordinary to good ordinary....do.....	17 to 20	16½ to 19
low middling to good middling do.....	20 to 23	19 to 23
Tobacco, lugs.....do.....	9 to 9¾	10 to 10½
common to medium leaf....do.....	10 to 12	11 to 12
Hay, eastern and northern.....per ton...	20 50 to 28 00	20 00 to 28 00
western choice.....do.....	———	———
Wool, Ohio and Pennsylvania.....per pound..	55 to 70	65 to 80
Michigan.....do.....	55 to 60	63 to 70
other western.....do.....	53 to 59	63 to 70
California.....do.....	20 to 45	32 to 52½
Texas.....do.....	35 to 45	45 to 55
pulled.....do.....	30 to 62	45 to 75
combing-fleece.....do.....	65 to 70	80 to 82
BALTIMORE.		
Flour, superfine.....per barrel..	5 50 to 8 75	5 25 to 8 50
extra.....do.....	6 50 to 9 25	6 50 to 9 25
family and fancy.....do.....	10 75 to 12 00	8 25 to 12 00
Wheat, red.....per bushel..	1 50 to 1 90	1 68 to 2 00
amber.....do.....	1 80 to 2 05	1 80 to 2 05
white.....do.....	1 80 to 2 05	1 85 to 2 10
Corn, yellow.....do.....	58 to 60	57 to 60
white.....do.....	60 to 68	57 to 63
Rye.....do.....	80 to 85	80 to 85
Oats.....do.....	39 to 43	42 to 47
Hay, western, good to prime.....per ton...	30 00 to 32 00	30 00 to 34 00
Beef, mess.....per barrel..	15 00 to 20 00	———
extra mess.....do.....	23 00 to 25 00	———
Pork, mess.....do.....	16 00 to ———	15 00 to 16 00
Lard.....do.....	8 to 10½	8 to 10½
Butter, choice and fancy.....per pound..	27 to 30	30 to 35
fair to good.....do.....	22 to 26	20 to 26
Cheese, western.....do.....	14½ to 15	14½ to 15
eastern.....do.....	14⅝ to 15¼	15 to 15½
Cotton, low middling to middling....do.....	19⅛ to 19⅝	18 to 19⅛
ordinary to good ordinary.....do.....	——— to 18⅝	15⅞ to 18¼
Tobacco, lugs, Virginia and Ky....per cental..	8 00 to 9 50	8 50 to 10 00
common to medium leaf.....do.....	10 50 to 12 00	10 00 to 11 00
Wool, fleece, common to fair.....per pound..	43 to 54	45 to 50
tub-washed.....do.....	45 to 49	53 to 56
unwashed, free from burs.....do.....	30 to ———	36 to 40
pulled.....do.....	38 to ———	40 to 43
CINCINNATI.		
Flour, superfine.....per barrel..	5 00 to 5 75	5 25 to 6 00
extra.....do.....	6 75 to 7 00	7 25 to 7 40
family and fancy.....do.....	7 00 to 9 00	7 40 to 9 00
Wheat, winter red.....per bushel..	1 43 to 1 45	1 45 to 1 68
Hill.....do.....	1 60 to 1 65	1 60 to 1 65
white.....do.....	1 50 to 1 70	1 68 to 1 75
Corn.....do.....	37 to 41	40 to 44
Oats, white, good to prime.....do.....	31 to 33	32 to 34
mixed.....do.....	28 to 30	27 to 31
Rye.....do.....	55 to 70	70 to 72
Barley, prime to choice fall.....do.....	85 to 90	85 to 90
prime to choice spring.....do.....	80 to 85	78 to 83

Market prices of farm products—Continued.

Articles.	November.			December.		
CINCINNATI—Continued.						
Hay, baled, No. 1 ..... per ton	$18 00	to	$21 00	$18 00	to	$21 00
lower grades ..... do	14 00	to	18 00	15 00	to	17 00
Pork, mess ..... per barrel	14 25	to	14 50	12 00	to	———
Beef, plate ..... do	12 75	to	13 00	15 00	to	———
Lard, city kettle ..... per pound	7⅞	to	8	7½	to	———
new prime steam ..... do	7⅞		———	7¼	to	———
Butter, Western Reserve, choice ..... do	23	to	25	25	to	28
Central Ohio ..... do	20	to	22	16	to	25
Cheese, factory ..... do	15	to	16	14½	to	15½
Cotton, ordinary to good ordinary ..... do	16	to	17⅞	15¾	to	17⅞
low middling to good middl ..... do	18⅜	to	19½	18	to	19½
Wool, common to med. washed fleece ..... do	47	to	48	47	to	48
medium to fine ..... do	48	to	50	48	to	50
tub-washed ..... do	50	to	55	50	to	55
unwashed, clothing ..... do	30	to	35	30	to	35
unwashed, combing ..... do	46	to	48	46	to	48
pulled ..... do	35	to	37	35	to	37
CHICAGO.						
Flour, winter, extras ..... per barrel	8 50	to	10 00	8 50	to	———
spring, extras ..... do	4 75	to	6 75	5 75	to	6 75
Wheat, No. 1 spring ..... per bushel	1 17	to	———	1 18	to	1 19
No. 2 spring ..... do	1 07½	to	1 08	1 09⅝	to	1 10
No. 3 spring ..... do	96	to	97½	99	to	1 01
Corn, No. 2 ..... do	31¼	to	31⅜	31	to	31¼
rejected ..... do	30	to	30½	29	to	———
Oats, No. 2 ..... do	20⅝	to	21⅜	24	to	25
rejected ..... do	17	to	17½	22	to	23
Rye, No. 2 ..... do	51½	to	———	57½	to	———
rejected ..... do	46½	to	47	———	to	———
Barley, No. 2 ..... do	62½	to	64½	61	to	62
rejected ..... do	38	to	42	———	to	———
Hay, timothy, (on track) ..... per ton	15 50	to	17 00	16 00	to	18 00
prairie, (on track) ..... do	10 00	to	11 00	16 00	to	17 00
Pork, mess ..... per barrel	14 00	to	15 00	12 00	to	13 00
Beef, mess ..... do	8 00	to	8 50	8 50	to	9 00
extra mess ..... do	9 00	to	10 00	9 50	to	10 00
Lard ..... per pound	07⅝	to	———	07¼	to	07⅝
Butter, choice dairy ..... do	25	to	26	24	to	28
medium to good ..... do	18	to	22	18	to	22
Cheese, New York factory ..... do	15	to	16	14	to	15
Ohio factory ..... do	13½	to	14½	12	to	13½
Wool, tub, common to choice ..... do	50	to	60	55	to	67
fleece-washed ..... do	38	to	52	45	to	57
pulled ..... do	40	to	45	40	to	45
SAINT LOUIS.						
Flour, spring extras ..... per barrel	5 00	to	6 00	4 80	to	7 30
winter superfine ..... do	4 00	to	4 25	4 50	to	5 00
extras to choice ..... do	4 50	to	9 00	5 25	to	9 50
Wheat, spring ..... per bushel	95	to	1 35	1 05½	to	1 25
winter, red ..... do	1 35	to	1 90	1 50½	to	1 90
white ..... do	1 48	to	1 65	———	to	———
Corn, mixed ..... do	30	to	41	33	to	———
yellow ..... do	41	to	———	33	to	———
white ..... do	50	to	———	34	to	———
Oats, white ..... do	26½	to	40	33	to	34
mixed ..... do	26	to	32	25¾	to	27½
Rye ..... do	52	to	55	58	to	61
Barley ..... do	45	to	85	55	to	1 00
Hay ..... per ton	13 00	to	18 75	13 00	to	23 00

Market prices of farm products—Continued.

Articles.	November.	December.
SAINT LOUIS—Continued.		
Pork, mess.....per barrel..	$16 00 to ———	$13 00 to$13 50
Beef, mess.....do.....	13 00 to$15 00	13 00 to 15 00
Lard, tierce.....per pound..	7¾ to 8¾	7½ to 7
keg.....do.....	9½ to 10	7½ to 8
Butter, choice.....do.....	26 to 30	24 to 28
medium to fair.....do.....	18 to 24	15 to 25
Cheese, Ohio factory.....do.....	15½ to 16	14¾ to 15
New York factory.....do.....	15½ to 16	15 to 15½
Northwestern fact ory.....do.....	15½ to 16	15 to 15½
Cotton, middling.....do.....	18½ to 19	18 to 18½
Tobacco, lugs.....per cental..	7 75 to 8 75	——— to ———
common to medium leaf....do.....	8 50 to 10 25	——— to ———
Wool, tub-washed.....per pound..	50 to 56	65 to 67
unwashed.....do.....	28 to 32	40 to 43
NEW ORLEANS.		
Flour, superfine.....per barrel..	5 25 to ———	5 37½ to ———
extras.....do.....	6 00 to 8 25	5 50 to 7 25
choice.....do.....	8 25 to 9 75	7 50 to 10 50
Corn, white.....per bushel..	70 to ———	59 to 60
yellow.....do.....	68 to ———	59 to 60
mixed.....do.....	67 to ———	58 to 59
Oats, ordinary.....do.....	38 to ———	——— to ———
prime to choice.....do.....	38 to 40	42½ to 44
Hay, prime.....per ton..	25 00 to 27 50	25 00 to 26 00
choice.....do.....	28 00 to 28 50	30 00 to ———
Pork, mess.....per barrel..	17 50 to 19 50	13 50 to 14 00
Beef, mess, (Texas).....do.....	11 00 to 11 50	11 00 to 11 50
Butter, choice western.....per pound..	22 to 23	20 to 22
Goshen.....do.....	33 to 34	33 to 34
Cheese, western factory.....do.....	15 to 15½	——— to 14
New York cream.....do.....	17 to 18	17 to ———
western reserve.....do.....	——— to ———	——— to ———
Cotton, ordinary to good ordinary....do.....	16 to 18¼	16⅛ to 17⅞
low middling to good middling..do.....	18⅜ to 19½	17⅞ to 19⅞
Tobacco, lugs.....do.....	8½ to 9½	8 to 9
low-leaf.....do.....	9½ to 10½	9¾ to 9¾
medium-leaf.....do.....	10½ to 11½	9 to 10¾
Wool, lake.....do.....	40 to ———	46 to ———
clean Louisiana.....do.....	35 to 37	40 to 42
SAN FRANCISCO.		
Flour, superfine.....per barrel..	3 75 to $4 10	3 90 to 4 09
extra superfine.....do.....	4 25 to 4 50	4 25 to 4 50
higher grades.....do.....	5 00 to 5 50	4 75 to 5 25
Wheat, State.....per cental..	1 45 to 1 62½	1 50 to 1 70
Oregon.....do.....	1 50 to 1 62½	1 50 to 1 70
Corn, white.....do.....	1 40 to 1 50	1 30 to 1 35
yellow.....do.....	1 37½ to 1 40	1 25 to 1 30
Hay, State.....per ton..	10 00 to 17 00	15 00 to 21 00
Pork, mess.....per barrel..	17 00 to 20 00	19 00 to 23 00
prime mess.....do.....	17 50 to 18 00	19 00 to 20 00
Beef, mess.....do.....	12 00 to 13 50	11 00 to 12 50
Lard.....per pound..	10¾ to 11½	10 to 11½
Butter, overland.....do.....	16 to 25	15 to 32½
California.....do.....	40 to 65	40 to 60
Oregon.....do.....	18 to 20	18 to 20
Cheese.....do.....	11 to 15	12 to 16
Wool, native.....do.....	10 to 20	12 to 20
California.....do.....	20 to 25	25 to 30
Oregon.....do.....	30 to 35	25 to 30

FOREIGN MARKETS.

WHEAT.—During October the weekly average price of wheat per quarter, in London, ranged from 56*s.* 7*d.* to 59*s.* In the quotations of the Mark Lane Express, American wheat is quoted at 59*s.* to 62*s.*; California, 66*s.*; English, 50*s.* to 64*s.*; German, 59*s.* to 71*s.*; Russian, 47*s.* to 61*s.*; Australian, 64*s.* to 67*s.* In Liverpool, American and California white maintained a steady maximum at 14*s.* 6*d.* per cental, ranging as low as 13*s.* Other varieties showed a gradual decline, red and southern ranging from 12*s.* 4*d.* to 13*s.* 6*d.*; spring, No. 1, 12*s.* to 12*s.* 9*d.* In Paris, prices per quarter ranged from 52*s.* 6*d.* to 56*s.* for white, and from 52*s.* to 54*s.* for red. The importations of wheat into the United Kingdom during the month amounted to 5,718,647 hundred-weight, of which amount 1,942,309 hundred-weight were from the United States—about 500,000 hundred-weight less than during October, 1871.

During the first three weeks of November the weekly averages of wheat in London, were from 56*s.* 6*d.* to 58*s.* 7*d.* per quarter; English white ranged from 58*s.* to 66*s.*; American, 58*s.* to 61*s.*; California, 65*s.* In Liverpool, American white was steady from 13*s.* 2*d.* to 14*s.* 6*d.* per cental: red winter and southern from 11*s.* 9*d.* to 12*s.* 8*d.*; spring No. 1, 11*s.* 9*d.* to 12*s.*; California white, 12*s.* 10*d.* to 13*s* 9*d.* In Paris, fine white wheat brought from 56*s.* to 58*s.* per quarter: red 53*s.* to 54*s.* At the opening of the month prices were too high for business, holders were generally firm and consequently but little activity was noticed.

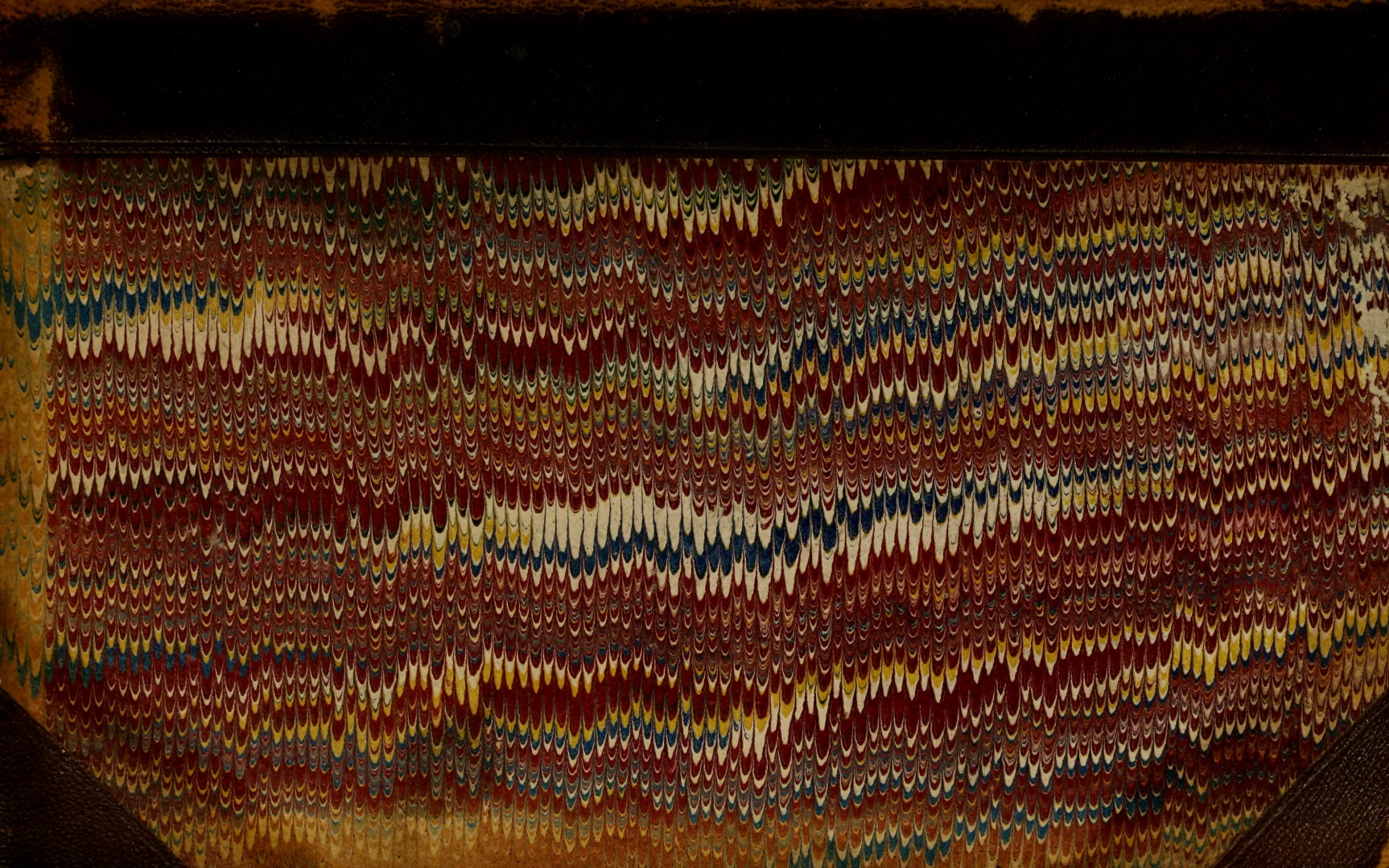
FLOUR.—The quotations of the Mark Lane Express, for London, during October, were as follows: English, per sack of 280 pounds, 40*s.* to 57*s.*; American, per barrel, 26*s.* to 29*s.*; extra, 30*s.* to 34*s.* Liverpool: English and Irish superfines, per 280 pounds, 41*s.* to 46*s.*; the same, extra, 47*s.* to 56*s.*: Hungarian and Trieste, 61*s.* to 75*s.*; Chilian and Californian, 41*s.* to 49*s.*; American, Western State, 28*s.* 6*d.* and 30*s.*: ditto, extra, 29*s.* 6*d.* to 31*s.*; Baltimore and Philadelphia, 32*s.* 6*d.* to 34*s.*: Ohio, 32*s.* to 33*s.*: Canadian, 30*s.* to 32*s.* Imports of flour into the United Kingdom during October, 636,199 hundred-weight, of which 114,749 hundred-weight were from the United States. In Paris the prices of superior flour, on the spot, rose from 43*s.* 2*d.* per 280 pounds, at the beginning of the month, to 46*s.* 2*d.* in the first week of November.

In London, during the first three weeks of November, English flour is quoted at 40*s.* to 57*s.* per 280 pounds; American 25*s.* per barrel and 30*s.* to 34*s.* for extras. In Liverpool, English and Irish superfines ranged from 41*s.* to 46*s.* per 280 pounds: extras 47*s.* to 56*s.* American, per barrel, Western States, 28*s.* 6*d.* to 30*s.*; extra State 29*s.* 6*d.* to 31*s.*: Baltimore and Philadelphia, 32*s.* 6*d.* to 34*s.*; Ohio, 32*s.* to 33*s.*

INDIAN CORN.—Mark Lane, London: 27*s.* to 31*s.* per quarter for yellow, and 32*s.* to 35*s.* for white. Liverpool: per 480 pounds, American white, 30*s.* to 32*s.*; the same, yellow, 29*s.* 6*d.* to 30*s.* 6*d.*: Trieste, 30*s.* to 31*s.*; Danubian, 30*s.* to 32*s.*

During the first three weeks of November Indian corn in London, ranged from 27*s.* to 29*s.* per quarter for yellow, and from 31*s.* to 34*s.* for white. Liverpool prices unchanged.

WOOL.—London: Fleeces, Southdown hoggets, per pound, 1*s.* 9¼*d.* to 1*s.* 10½*d.*; half-breed, ditto, 1*s.* 9½*d.* to 1*s.* 10*d.*; Kent fleeces, 1*s.* 10½*d.* and 1*s.* 11*d.*; Southdown ewes and wethers, 1*s.* 9*d.* to 1*s.* 10*d.*; Leicester ditto, 1*s.* 11*d.* and 2*s.* Prices during the first three weeks of November unchanged.

CHEESE.—London: per hundredweight, Cheshire, 60*s.* to 70*s.*; double Gloucester, 56*s.* to 76*s.*; Cheddar, 70*s.* to 80*s.*; American, 54*s.* to 64*s.* November, (first three weeks) Cheshire, 60*s.* to 76*s.* per cwt., double Gloucester, 64*s.* to 78*s.*; Cheddar, 68*s.* to 84*s.*; American, 60*s.* to 72*s.*

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